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TELEPHONY AS A FINE ART AND A BUSINESS-GETTER.

Out of the three methods of rapid transmission of human messages—telegraph, telephone and telagirl—the last is wireless but dangerous, the first covers the greatest distance and the second is of the greatest commercial importance. There are different efficiences, however, in telephone-usage. Many people only use the phone for the purpose of calling up or calling down the other fellow. Where an unlimited service is provided the telephone can be the means of greater business efficiency if it is used systematically.

This fact was forcibly brought to our attention about a year ago and will illustrate the question under consideration. We wanted a pump, a duplex pump, and from a buyers' directory we selected a firm-name which contained the words "Duplex-Pump." They were 65 miles away. We wrote for catalog and prices and received them. That was Saturday. On Monday, by long-distance phone, we were asked if we had decided. We told them we would not know for two weeks. Two weeks later to the day we were phoned again. Several things prevented our decision for another week. They received the order after phoning six times at 50 cents a call. We paid $26.00 more for that pump than for any other pump in the market. It was a good pump. Our customer was satisfied and so were we. Now that follow-up phoning helped some. The man at the other end of the wire knew his business and his constancy and strength of argument won the day.

Later on the writer went over to the company's office to investigate this phone follow-up system. They had two follow-up lists, one for live follow-ups and the other for possibles. The first consisted of cases like ours.

The second was a list of all the people they should keep in touch with. This list was divided into daily sections and every day one section was visited by phone. The man who handled that phone was an artist. He had a strong, clear, pleasing voice. He knew the trade. He was well vers-

ed in local conditions. From each he would extract some statement as to possibilities of future business; he would ask if catalog "A" had been sent or if they had inspected the latest addition to the company's lines. His "Drop in and see us when down town" was as good as a hand-shake.

Did you ever use the phone to follow up the people you feel you ought to see but never seem to be able to find time to see? You should. You will often find that they want to see you. It should always be remembered that "Absence makes the heart grow fonder" of the other fellow. Try 15 minutes each day as a follow-up exercise and you will be gratified at the result. You may find some of your communicants have a grouch. That's worth a great deal. A man with a grouch that you don't know about is a dangerous quality. He wants to be seen right away.

Make the telephone pay the highest possible dividend. It can lead you to jobs you wot not of. It can steer you from dangers of which you were unaware. It can cinch a contract, decide a profit and hold a customer. Telephony is a fine art and a business-getter.

"DOMESTIC ENGINEERING" AS A BUYERS' GUIDE.

We announce with gratification the addition to "Domestic Engineering's" pages of an improvement which will be appreciated by all of our busy readers. This has been effected in our "Index to Advertisements," and our "Buyers' Directory." In the "Index to Advertisements" we have supplied the firm's or company's name and town-address. This will enable you to turn to our pages at any time and conduct correspondence with any of these manufacturing concerns without the possible delay of having to find the issue in which appeared the advertisement that attracted your attention. It is a good plan to write to an advertiser as soon as you are confronted with the possibility of using some of his lines in any special installation. The latest literature issued by him on these goods is available to you at call. You can thus keep posted on all the improvements effected.

The "Buyers' Directory" has been enlarged to three times its former size. Just look over it and note its extensive range. Are you interested in "Brass Traps"? Go to it. On page 70, you will find twelve of the leading companies making these goods. You will not have to say again "Jim, who in h—— makes brass traps anyway?" after a fruitless search among the catalogs heaped up in the shop-corner. You can spend the next ten minutes profitably in reading the headings of our buyers' directory from beginning to end so that you will become familiar with their form. To illustrate this advantage, supposing you wanted to correspond with manufacturers of porcelain or china (whatever name you are accustomed to give them) baths. The manufacturers insist on these goods being classified as "Vitreous-China Sanitary Ware." Under that heading you will therefore find them. We mean our index and directory to be business tools for your advantages. They will save you time if properly and effectively used and time means money and money means shoes for the baby.

Now it may be that you will find in the use of these helps to business that in one or two places a profitable change might be made. Don't be satisfied with saying, "If 'Domestic Engineering' had only included this, the index or directory would have been perfect." **Tell us about it.** It is more profitable for us to know our defects than our good points. A good call-down helps to keep our editor humble and he needs it. One more word. When you write to advertisers through our index and directory-assistance, put the letters "D. E." on top of the letter. These letters will indicate to them that our labors are not in vain.

OUR CARTOONS ARE APPRECIATED.

We wish to thank the many readers who have expressed in writing their appreciation of the beneficial effect of our cartoons. These communications arrive daily, all requesting one or more of them for framing. We mail them in cardboard tubes and if any are damaged in transit we will be glad to replace them immediately. We have had many questions as to the authorship of these illustrations. The editor of "Domestic Engineering," H. de Joannis, is their designer. He says that some of his best cartoons have been evolved while hanging on a strap in an elevated car, journeying homeward. They evidently must be shaken out of him. One of our subscribers sent us an excellent rough sketch of an idea for a cartoon the other day. This will be shaped up and published in two or three weeks. Many of you are doubtless cartoonists in embryo. We will be pleased to receive suggestions for cartoons applicable to the plumbing and heating trades. Everybody get out and push and the chariot surely will move.

Needed Another Face.

She had a hat like a hayfield, and was sitting in the fifth row of the pit. She flattered herself she was looking uncommonly handsome. The gentle finger of a pale-faced man, sitting behind her, tapped her on the shoulder. "Please, miss," murmured that unfortunate individual, "do you mind removing your—ahem!—your hat?" "Yes, I do!" she snapped. "Look here, miss," persisted the pale gentleman, "I want to look as well as you." "Oh, do you?" she retorted, turning round and looking him straight between the eyes. "Then you'd better run home and change your face!"

The Proposed Cleveland Plumbing Code

Cleveland, O., has long been known as a vigilant city in regard to sanitary conditions. The master plumbers and journeyman plumbers of Cleveland for several years have not been satisfied with the existing code. Four years ago individual plumbers began a tentative revision of the code, and these individual efforts resulted in the appointment of a committee, consisting of five master plumbers and five journeymen plumbers, for the purpose of a complete and concerted revision of the code. No plumbing code has ever received more prolonged attention. It was presented to the Ohio State Association and declared by that association superior to the existing code. Cleveland plumbers have implicit confidence in its excellence and will be glad to have your commendations or criticisms of this code in the columns of "Domestic Engineering." It will be presented to you in two sections. The first is published herewith and the second will appear in our issue of March 18th. Study the points in which you are interested. We will be glad to hear from you and publish your comments on the features upon which you agree or disagree in special fashion.

HOUSE DRAINAGE AND PLUMBING.

A NEW ORDINANCE to amend sections 201, 202 and supplement 1120 of the Revised Ordinances of 1907 and regulate the location, construction and repairs of all water closets, privies, cesspools, sinks, plumbing and drains, and to provide for the carrying into effect of "An act to amend the section 2122 of the Revised Statutes of Ohio, as amended May 7, 1902, in relation to duties of Boards of Health in cities."

Whereas, Section 2122 of the Revised Statutes of Ohio, as amended April 2nd, 1906, empowers the Council of the City of Cleveland to prescribe by ordinance such rules and regulations as are approved by the Board of Health of the City of Cleveland, for the location, construction and repair of all water closets, privies, cesspools, sinks, plumbing and drains and

Whereas, the said Board of Health of the City of Cleveland has approved the following rules and regulations as are approved by the Board of Health of the City of Cleveland, for the location, construction and repair of all water closets, privies, cesspools, sinks, plumbing and drains and

Whereas, the said Board of Health of the City of Cleveland has approved the following rules and regulations;

Now, therefore, be it ordained by the Council of the City of Cleveland, State of Ohio,

Section 1. That section 201 of Revised Ordinances of 1907 be amended to read as follows:

Section 201. New Buildings and Buildings to be Altered.—No wall, structure, building or any part thereof shall hereafter be built or constructed nor shall the heating apparatus, gas fitting, elevator work, plumbing, or house drainage of any building, premises or structure, be installed, constructed or altered in the City of Cleveland except in conformity with the provisions of this Code. No building already erected or hereafter to be built in said City shall be raised, altered, built upon or moved in any manner nor shall any heating apparatus, gas fitting, elevator work, house drainage or plumbing be installed that would be in violation to any of the provisions of this Code or the permits issued and thereunder.

Sec. 2. That Sec. 202 of Revised Ordinances of 1907 be amended to read as follows:

Sec. 202. Permits.—Before commencing or proceeding with the erection, construction, enlargement, alteration, repair or removal of any building, structure, heating apparatus, gas fitting, elevator work, house drainage, plumbing, or any part thereof in the City of Cleveland a permit therefor shall first be obtained by the owner or his agent or the architect from the Inspector of Buildings and it shall be unlawful to commence or proceed with any such work unless such permit shall first have been obtained.

Sec. 3. That Sec. 1120 of the Revised Ordinances of 1907 be supplemented by adding thereto the following sections 1120-1 to 1120-274.

PART VI.

HOUSE DRAINAGE AND PLUMBING.

Sec. 1120-1. This part of the BUILDING CODE shall be known as the HOUSE DRAINAGE AND PLUMBING CODE, of the City of Cleveland, and contains the rules and regulations, under and in conformity to which all the house drainage, plumbing and water supply of buildings shall be executed, the permits for which shall be obtained by the licensed plumber or sewer builder before proceeding with the work.

TITLE I.

DEFINITION OF TERMS.

In these regulations the following terms mean:

Sec. 1120-2. Code.—The word Code, when used alone, pertains only to this part of the Building Code.

Sec. 1120-3. Inspector.—When the word Inspector is used, without prefix or suffix, it means the Inspector charged with the enforcement of the provisions of this Code.

Sec. 1120-4. Sewer.—Sewer is a general term for the system of horizontal piping used to convey the drainage from any building or building site to a main public or private sewer or cesspool.

Sec. 1120-5. Private Sewer.—A Private Sewer is a main or branch sewer located either on public or private property, not constructed or accepted by the City, which conveys the drainage of one or more buildings or building sites to its public outlet.

Sec. 1120-6. House Sewer or Main Drain.—The House Sewer, Lateral or Main Drain is that part of the horizontal piping of a house drainage system extending from the house drain to its connection with the main sewer or cesspool, and conveying the drainage of but one building or building site.

Sec. 1120-7. House Connection.—A House Connection is that part of a house sewer or main drain between the main public sewer and curb line.

Sec. 1120-8. House Drain.—The House Drain is that part of the horizontal piping of a house drainage system which receives the discharge of all soil, waste and other drainage pipes inside the walls of any building and conveys the same to the house sewer or main drain on the outside of the foundation walls of such building.

Sec. 1120-9. Subsoil Drain.—The Subsoil Drain is that part of a drainage system which conveys the subsoil or ground or seep water from the foot of walls or below the cellar bottom under buildings, to the house sewer, but independent of the house drain.

Sec. 1120-10. Yard Drain.—A Yard Drain is that part of the horizontal piping and its branches which conveys the surface drainage from areas, courts, yards, or roof leaders outside the walls of a building to the house sewer or main drain.

Sec. 1120-11. Crock Sewer or Drain.—A Crock Sewer or Drain is any sewer or drain constructed of vitrified earthenware pipe with hub and spigot ends.

Sec. 1120-12. Tile Drain.—A Tile Drain is any subsoil drain constructed of earthenware or cement pipe, without hub and spigot ends.

Sec. 1120-13. Conductors or Roof Leaders.—Conductors or Roof Leaders are conveyors which carry the storm or rain water from the roofs of buildings to the house or yard drain. The term Down Spout is usually applied to the vertical portion of such conveyors.

Sec. 1120-14. Catch Basin.—A Catch Basin is a water tight receptacle built to arrest the sediment of surface, subsoil or other waste drainage before overflowing into a sewer or drain.

Sec. 1120-15. Cesspool.—The term Cesspool, when used without a prefix or suffix, is any underground well, vault, tank, or other air and water-tight receptacle which receives the house drainage.

Sec. 1120-16. Fixture or Fixtures.—The term Fixture or Fixtures, when used in a general sense, applies to all receptacles which receive the house sewage, or waste with which water is used as a flush or flux; when used specifically it means any of such receptacles other than water closets.

Sec. 1120-17. Trap.—A Trap is a fitting so constructed as to prevent the passage of air or gas through a pipe without materially affecting the flow of sewage or waste water therein.

Sec. 1120-18. Traps—Depth of Seal.—The depth of the Seal of a Trap is the height of the water column measured between the point of overflow and the dip or division level separating the inlet and outlet arms of the trap.

Sec. 1120-19. Mains.—The Main of any system of horizontal, vertical or continuous piping is that part of such system which receives the discharge of back vents from fixture outlets, direct or through branch pipes.

Sec. 1120-20. Branches.—The Branch of any system of piping is that part of the system which extends horizontally at a slight grade, with or without lateral extensions or vertical arms, from the main to receive fixture outlets not directly connectable with the main.

Sec. 1120-21. Stack.—Stack is a general term for any vertical line of house drainage piping inclusive of the main and its branches.

Sec. 1120-22. Soil Pipe.—A Soil Pipe is any pipe which conveys the discharge of water closets, with or without other fixtures, to the house drain.

Sec. 1120-23. Waste Pipe.—A Waste Pipe is any pipe which receives the discharge of any fixture, except water closets, and conveys the same to the house drain or soil pipe. When such pipe does not connect directly with a house drain or soil stack it is termed a Safe Waste.

Sec 1120-24. Vent Pipe.—A Vent Pipe is any pipe provided to ventilate a drainage and plumbing system of piping and to prevent trap syphonage and back pressure.

Sec. 1120-25. Back Vent Pipe.—A Back Vent Pipe is that part of a vent pipe line which connects directly with an individual trap underneath the fixture and extends either to the main or branch vent pipe.

Sec. 1120-26. Soil or Waste Vent.—The Soil or Waste Vent

is that part of the main soil or waste pipe above the highest installed branch or fixture outlet connection, extending through the roof.

Sec. 1120-27. Circuit Vent.—A Circuit Vent is a system of venting by which syphonage and back pressure on the seal of traps is prevented by extending the branch soil or waste pipes, and connecting them with a vent stack main; which main forms a continuous air circuit or vent for each branch line so installed.

Sec. 1120-28. Loop Vent.—A Loop Vent is a circuit vent where the branch or branches of soil or waste pipes of any floor having no other fixture or branch installed above them, loop over above the fixtures and reconnect with the main soil or waste vent lines.

Sec. 1120-29. Local or Surface Vent.—The Local or Surface Vent is a pipe by which the foul air in bowls or water closets or other plumbing fixtures, is removed.

Sec. 1120-30. Sizes and Lengths.—The given caliber or size of pipe is for a standard internal diameter, except for brass pipe other than iron size and the length of a pipe is its developed length along the center line.

Sec. 1120-31. Spacing.—The distance of lines of pipes from each other is the distance taken at a right angle between centers of pipes. The spacing of fixtures from pipes is the developed length of the waste or branch line, measured between centers of pipes and the seal of the fixture trap.

Sec. 1120-32. Existing.—When the term Existing is used in conjunction with the term building or house drainage or plumbing, it means any building or part thereof erected, or any house drainage or plumbing system or part thereof installed prior to the legal promulgation of this Code—or any building or part thereof erected prior to the extensions of the public sewer service into the district in which such building is located.

TITLE II.

SIZES OF PIPES AND TRAPS.

Sec. 1120-33. In the design or installation of any house drainage or plumbing system, unless otherwise elsewhere in this Code prescribed, the following tables of minimum sizes of pipes shall be used for all mains and branches.

Sec. 1120-34. House Drains with Roof Leader Connections.—The house sewer and house drain must be at least four inches in diameter where water-closets discharge into them. Where rain water discharges into them the house sewer and house drain up to the leader connections must be in accordance with the following table:

Diameters.	Fall ¼" per ft.	Fall ½" per ft.
6 in.	5,000 sq. ft.	7,500 sq. ft. of drainage of area.
7 in.	6,900 sq. ft.	10,300 " " "
8 in.	9,000 sq. ft.	13,600 " " "
9 in.	11,600 sq. ft.	17,400 " " "

and for larger areas the same proportion.

Sec. 1120-35. Waste Pipe Stacks.—In the table of size of waste pipe the following notation of fixtures and equivalents shall be used:

Fixtures with—

1¼	inch	traps	count as 1 fixture
1½	"	"	" " 1 "
2	"	"	" " 2 "
2½	"	"	" " 3 "
3	"	"	" " 4 "
4	"	"	" " 5 "

The diameter of waste stacks must be not less than the following tables:

For six stories or less two (2) inch.
For ten stories or less two and one-half (2½) inch.
For sixteen stories or less three (3) inch.

Sec. 1120-36. Sizes of Fixtures, Traps and Wastes.—The size of the traps and waste branch for a given fixture shall never be less than as follows:

Kind of Fixture.	Sizes in Inches Trap	Branch
Water Closet	3	4
Slop Sink with Trap combined	3	3
Slop Sink, Ordinary	1½	1½
Pedestal Urinal	3	3
Floor Drain or Wash	3	3
Yard Drain or Catchbasin	3	3
Urinal Trough	2	2
Laundry Tub (1 to 3)	1½	1½
Laundry Tub (group of 4 to 6)	2	2
Kitchen Sinks (small) for dwellings and single suites	1½	1½
Kitchen Sinks (large) hotels, public	2	2
Pantry or Bar Sinks	1¼	1¼
Pantry Sinks (large) hotel or public	1½	1½
Wash Basin, one only	1¼	1¼
Wash Basin, group of 2 or 3	1½	1½
Bath Tubs	1½	1½
Shower Baths	2	2
Sitz Baths	1¼	1¼
Safe Wastes and Drips	1	1
Drinking Fountains	1¼	1¼
Fountain Cuspidors	1¼	1¼
Refrigerator	1¼	1¼

Sec. 1120-37. Vent Pipe Stacks.—The diameter of Vent Pipe Stacks shall be not less than the following table:

For six stories or less two (2) inch.
For ten stories or less two and one-half (2½) inch.
For sixteen stories or less three (3) inch.

Sec. 1120-38. Back Vent Pipes.—The back vent pipes shall be of not less than the following sizes:

1½ in. in diameter for 1¼ in. traps and less.
1½ in. in diameter for 1½ in. to 2½ in. traps.
2 in. in diameter for 3 in. to 4 in. traps.
½ their diameter for 5 in. traps and over.

Not more than three (3) water closet traps shall be served by a two (2) inch pipe, and no more than thirty (30) feet of said pipe shall be used between the fixture and main vent pipe; not more than six (6) water closet traps shall be served by a two and one-half (2½) inch pipe. Not more than twelve (12) from a three (3) inch pipe, not more than twenty-five (25) from a three and one-half (3½) inch pipe, and not more than forty (40) from a four (4) inch pipe.

Vent pipes serving small fixtures shall not be longer than twenty (20) feet of 1½ inch pipe, serving 1½ inch trap. Not more than two (2) small fixtures shall be vented from a 1½ inch pipe.

Sec. 1120-39. Local Vent Pipe Stacks.—The unit of a local vent for a single water closet is a two (2) inch pipe. The same unit shall be applied to the pedestal urinal, urinal bowl, slop hopper or sink and to each three (3) foot sectional length of urinal trough or gutter.

Sec. 1120-40. Soil and Waste Pipe Stacks.—The diameter of main and branch soil and waste pipe stacks must be not less than the following table:

Main soil pipe 24 closets or less, four (4) inch.
Branch soil pipe 12 closets or less, four (4) inch.
Main soil pipe 48 closets or less, five (5) inch.
Branch soil pipe 24 closets or less, five (5) inch.
Main soil pipe 84 closets or less, six (6) inch.
Branch soil pipe 42 closets or less, six (6) inch.

Sec. 1120-41. Ventilating Pipes.—When water closet compartments, toilet or bath rooms are, under this Code, required to be ventilated, there shall be apportioned not less than twenty-eight (28) square inches or the ventilating unit equivalent to the area of six (6) inch circular pipe for each water closet.

For each additional fixture installed the proportionate area of such fixture shall be added to the vent opening.

TITLE III.

MATERIAL, QUALITY AND WEIGHTS.

Sec. 1120-42. Quality.—All materials used in any drainage or plumbing system, or any part thereof, shall be free from defects. And all work must be executed in a thorough and workmanlike manner.

Sec. 1120-43. Label, Cast or Stamped.—Each cast pipe, bend, trap or fitting used in any plumbing or drainage system shall have its weight designation, and maker's name or mark clearly cast or stamped upon the exterior surface.

Sec. 1120-40. Earthenware Pipe.—All earthenware pipe and fittings used for sewers, house drains or yard drains shall be of the hub and spigot pattern, cylindrical in section, thoroughly vitrified through the thickness of the pipe, and salt glazed over the entire inner and outer surface. The thickness of the shell of such pipe shall be uniform and of the quality known to the trade as "Standard," except that when the diameter of such pipe exceeds four (4) inches, "Standard pipe with deep and wide Sockets" shall be used. Each length shall be smooth bore throughout, free from fire cracks, blisters, flaws or other defects, nor shall any pipe vary more than one-twenty-fourth (1/24) of its diameter between any two diameters. Earthenware pipe used for tile drains may be of unglazed without hub or socket.

Sec. 1120-44. Cast-Iron.—All cast-iron pipes and fittings must be coated with coal tar preservation solution, sound, cylindrical and smooth, free from cracks, sand-holes and other defects, and of uniform thickness and of the grade known in commerce as "extra heavy."

Sec. 1120-45. Weights of Cast-Iron Pipe.—No cast-iron pipe used in any drainage or plumbing system shall weigh less per lineal foot, including hubs, than the following:

Diameter.	Extra Heavy.
2 inches	5½ lbs.
3 inches	9½ lbs.
4 inches	13 lbs.
5 inches	17 lbs.
6 inches	20 lbs.
7 inches	27 lbs.
8 inches	33½ lbs.
10 inches	45 lbs.
12 inches	54 lbs.

Sec. 1120-46. Wrought Iron Pipe.—No wrought iron pipe used in any drainage or plumbing system shall be of less thickness or weight than standard lapwelded pipe.

Sec. 1120-47. Drainage Fittings.—Fittings for wrought iron waste, soil and refrigerator waste shall be heavy cast iron recessed and threaded drainage fittings, with smooth interior waterway and threads tapped out of solid metal so as to give a uniform grade to branches of not less than one-fourth (¼) of an inch per foot.

Sec. 1120-48. Coatings for Wrought Iron Pipe and Fittings.—Wrought iron pipes must be galvanized and each length must be standard size and weight.

Fittings for vent pipes on wrought iron pipes may be the ordinary cast iron steam and water fittings; or malleable galvanized fittings.

Sec. 1120-49. Brass Pipe.—Brass pipe for soil, waste and vent pipes shall be thoroughly annealed, seamless drawn or brazed tubing having weight and outside diameter of not less than the following:

Concealed or Exposed.				Exposed Only.		
Nominal Diam.	Gauge No. B.& S.	Thickness.	Weight	Gauge No. B. & S.	Thickness	Weight
1¼ in.	12	5-64 in.	1.08 lbs.	14	1-16 in.	0.88 lbs.
1½ in.	12	5-64 in.	1.32 lbs.	14	1-16 in.	1.06 lbs.
2 in.	12	5-64 in.	1.79 lbs.	14	1-16 in.	1.43 lbs.
2½ in.	10	7-64 in.	2.82 lbs.			
3 in.	10	7-64 in.	3.41 lbs.			
4 in.	8	1-8 in.	5.74 lbs.			
5 in.	8	1-8 in.	7.22 lbs.			
6 in.	8	1-8 in.	8.71 lbs.			

and for flush and Local Vents No. 18 gauge may be used. Drawn tubing only shall be used for the larger sizes, two and one-half (2½) inches to six (6) inches, and brazed tubing may be used for the smaller sizes, one and one-quarter (1¼) to two (2) inches.

Sec. 1120-50. Brass Drainage Fittings and Connections.—Brass drainage fittings shall be of good quality cast brass having a thickness in their walls not less than the tabular thickness given above for the corresponding brass pipe for union connection; but if recessed fittings are used, the thickness of the walls at their socket ends, before tapping, shall be at least one and one-half (1½) times the thickness of the corresponding pipe.

Brass pipe fittings with a screw joint connection shall have not less than the following number of threads per inch and depth of bite:

Size of pipe.	Number of threads per in.	Depth of bite
1¼ inch to 2 inch.....	20	½ inch
2½ inch and 3 inch.....	12	¾ inch
4 inch to 6 inch.....	12	1 inch

Brass union fittings shall be tapped so as to cover the pipe threads and the threads in them so cut that the pipe ends will butt; recessed fittings, however, shall be so tapped and threaded that the ends will butt full on shoulder of fitting so as to form a flush, continuous interior surface.

Sec. 1120-51. Calking Ferrules.—Brass calking ferrules shall be tapered or recessed, extra-heavy cast brass, not less than four and one-half (4½) inches long and one-eighth (⅛) of an inch thick in every part, free from sand-holes and other defects, thoroughly tested before calking. Hub ferrules may be used when made of the same material and thickness as calking ferrules with a wiping surface of at least ¾ of an inch and not less than two (2) inches in depth.

Sec. 1120-52. Calking Ferrules.—Length, Thickness, Material made of—No brass calking ferrules of less length and corresponding diameter than shown by the following table shall be used where a round joint is made. Ferrules shall be made of best quality of red brass:

Inside Diameter.	Least Length.	Thickness
2¼ inch	4½ inch	⅛ inch
3¼ inch	4½ inch	⅛ inch
4¼ inch	4½ inch	⅛ inch

And where reducing and cup or similar ferrules are used they shall conform to the above tables as to thickness and quality of brass, and the top of the ferrules shall extend at least one-quarter (¼) inch above the hub.

Sec. 1120-53. Soldering Nipples.—Soldering nipples shall be made of heavy cast red brass, or of standard iron pipe size brass pipe.

No brass bushing of less than three (3) inch in diameter shall be used for connecting lead and iron pipe.

Sec. 1120-54. Screw Caps.—Brass Screw caps or plugs for cleanouts shall be extra heavy, not less than one-eighth of an inch thick, and where they screw into iron pipe they shall have a solid square or hexagonal nut ⅞ inch high or countersunk with a diameter of not less than 1½ inches. When the body of the cleanout ferrule is of cast iron it shall be equal in thickness to extra heavy cast iron soil pipe, and when of wrought iron it shall be equal in thickness to standard wrought iron pipe. When the screw cap and ferrule are both of brass they shall conform to the thickness required for calking ferrules of the same size pipe and the nut need be only ⅜ inch high or counter-sunk.

Sec. 1120-55. Cleanouts.—Where cleanouts on metal pipe are required by this code, the screw caps shall be of brass if pipe is of iron and may be of iron if pipe is of brass. When they enter or screw over cast or wrought iron pipe they shall have not less than six threads of iron pipe size and be tapered, except that cleanout screws on fixtures side of traps, or in traps, seal, or where the top of the cleanout screw is level with the top of the trap outlet, may be made tight with a loose screw and an approved washer.

Cleanouts must be of full size of pipe or trap up to four (4) inches in diameter, and not less than four (4) inches for larger pipes or traps.

Sec. 1120-56. Lead Pipe.—Lead pipe or bends used in a drainage or plumbing system shall be drawn pipe.

Sec. 1120-57. Weight of Lead Pipe.—All pipe used in branch soil, waste, vent or flush pipes shall be of the best quality, of not less weight per lineal foot than shown in the following table:

(a) Lead Pipe, Bends and Traps.

Internal diameter.	Weight per foot.
1 inch	1 lb. 8 oz.
1¼ inch	2 lbs. 8 oz.
1½ inch	3 lbs. 8 oz.
2 inch	4 lbs.
3 inch	6 lbs.
4 inch	8 lbs.

(b) Lead Water Supply Pipe Under Ground.

Shall not be lighter than grade known as "Extra strong."

(c) Lead Water Supply Pipe Above Ground.

Shall not be lighter than grade known as "Strong."

Sec. 1120-58. Sheet Lead.—Sheet lead for roof flashing shall be not less than four (4) pound lead, and shall extend not less than six (6) inches from the pipe, and the joint shall be made water tight.

Sec. 1120-59. Copper.—Copper tubing, when used for inside leader connections shall be seamless drawn tubing, not less than No. 14 B. & S. gauge; and when copper is used for roof leader flashings it shall not be less than No. 18 gauge and for local vents and interior ventilation pipe spiral or plain pipe gauge No. 26.

Sec. 1120-60. Galvanized Iron Sheet Metal.—Galvanized iron when used for local vent and interior ventilating pipe shall be air-tight spiral or plain pipe of not less than the following B. & S. gauges:

No. 26.....for 2 in. to 12 in. pipe
No. 24.....for 13 in. to 20 in. pipe
No. 22.....for 21 in. to 26 in. pipe

TITLE IV.

JOINTS AND CONNECTIONS.

Sec. 1120-61. Water and Gas Tight Joints.—All joints and connections mentioned in this title shall be made gas and water tight.

Sec. 1120-62. Crock Sewers—Joints.—Earthenware pipe joints in crock house sewers or drains inside the walls of any building shall have the joint made by first calking of hub half full with a gasket of oakum and then filling the balance with good Portland cement mortar freshly mixed, made of one (1) part of Portland cement and three (3) of clean, sharp sand. Each joint shall be carefully banked, wiped and cleaned on the inside with a swab before the next joint is made. No retempered cement shall be used.

Sec. 1120-63. Crock Sewers—Joints, of yard, roof and surface drains.—Crock house drains or sewers in which the hub and spigot ends of pipe are also blazed, shall have the joint made by first calking the hub half full of oakum and then filling in the balance with cement mortar.

Crock sewer or drains laid outside the walls of a building may have the gasket of oakum omitted, but joints shall be completely filled with Portland cement mortar, as prescribed in Section 1120-62.

Sec. 1120-64. Crock Sewers—Iron and Metal Pipe Connections.—All underground joints connecting iron pipe with crock sewers or drains shall be made with oakum and cement as prescribed in Sec. 1120-62, but in no case shall the iron pipe be more than one size smaller than the crock sewer inlet, unless an increaser or reducer be used.

Sec. 1120-65. Cast-Iron Calked Joints.—All joints must be made with picked oakum and molten lead and made gas and water tight. Twelve (12) ounces of fine, soft, pig lead must be used at each joint for each inch in diameter of the pipe, and well calked when cold.

Sec. 1120-66. Cast-Iron—Rust Joints.—Cast-iron rust joints shall be made by first calking a gasket of oakum tightly into the hub, and then filling the hub with a cement made of flour of sulphur, sal-ammoniac and iron borings or fillings or its equivalent.

Sec. 1120-67. Lead Joints—Prohibited.—Only sal-ammoniac, Portland cement and other equally efficient joint shall be permissible in drainage and plumbing system to be used for carrying off fluids, containing acids deleterious to lead joints or in lines subject to extreme alternating ranges in temperature.

Sec. 1120-68. Wrought Iron and Brass Joints.—When wrought iron or brass pipes are used, separately or in connection with each other, all joints in such pipe shall be screw joints and all burrs or cuttings on the inside of such pipes shall be removed before the joints are made up. All screw joints shall be made up with white or red lead, or mineral paint applied to the male part of the threads.

Sec. 1120-69. Lead Connections.—All connections in a drainage or plumbing system between lead pipes and between lead and brass or copper pipes shall be made by means of "wiped" soldered joint; the use of "cup-joint" connections shall be prohibited except on the fixture side of traps, clean-out screws

or joints in trap seals, trap screws and floor flanges for connections.

Sec. 1120-70. Lead and Iron Connections.—Connections between lead and iron pipe shall be made with a brass ferrule with a calked joint or soldering nipple with a threaded joint.

Sec. 1120-71. Slip Joints and Unions.—All unions used on the sewer side of traps shall be ground faced, but shall not be concealed or enclosed.

The use of slip joints and lock-nut couplings on the outlet or drain side of any trap shall be prohibited inside of any building. All such connections shall be made as close up to the trap as possible, but shall not be concealed or enclosed.

Sec. 1120-72. Clamp Joints.—Iron caps provided with brass bolt and nut connections provided with machine finished flange and seat may be used only on clean-outs on the upper side of cast iron pipe, fittings or traps, on the inlet or house side of traps, or in trap seals, and for clean-outs of traps on the sewer side of traps where the top of the outlet from the trap is on a level with or above the washer joint.. In making such joints asbestos or lead gaskets shall fit smooth and flush with the bore of the pipe. All such joints shall be kept in open sight, not concealed or covered up.

Sec. 1120-73. Earthenware with Metal Floor Connections.—Every fixture with an earthenware trap connected directly with the soil or waste pipe shall have a solid brass floor plate, not less than three-sixteenths (3/16) of an inch thick, soldered to the lead bend or pipe, and screwed to floor where floor is of wood, or where a brass or iron pipe is used, screwed to the same end bolted to the trap flange and the joint made gas-tight with an asbestos graphite ring or asbestos string gaskets or washers without the use of red or white lead or any similar plastic substance. Cast iron traps or fittings without proper flanges shall not be used to make the floor connections of any fixture.

In wooden joist construction all connections of earthenware water closets or other fixtures to the soil pipe shall have at least two (2) inches of lead pipe between the wiped joint and the under side of the floor.

Sec. 1120-74. Screw and Lead Connections.—When sanitary screw connections are used in connecting to lead pipes or bends or traps to prevent twisting when setting or removing fixtures or cleanout caps, the brass floor flanges shall be extended and thoroughly secured or screwed to the floor outside the solder joints.

Sec. 1120-75. Increasers and Reducers.—Where different sizes of pipe and fittings are to be connected, proper sized increasers or reducers, pitched at an angle of not less than forty-five (45) degrees between the two sizes shall be used.

Sec. 1120-76. Prohibited Joints and Connections.—In addition to the bushed joints, all joints made with interior calking or bushings or fittings, or any connection which has or forms an enlargement, chamber or recess with a ledge shoulder or reduction of the pipe area in the direction of the flow on the outlet or drain side of any trap, shall be prohibited.

Sec. 1120-77. Expansion Bolts.—Connections of wall hangers, pipe supporters or fixtures settings with the masonry or stone backing shall be made with expansion bolts without the use of wooden plugs.

TITLE V.

TRAPS AND CLEAN-OUTS.

Sec. 1120-78. Forms of Traps.—Every trap used on a drainage or plumbing system shall be self-cleaning. No form of trap which depends upon the action of movable parts for its seal shall be used. No trap which depends upon concealed interior partitions or deflectors for its seal or re-seal or which has an interior partition that, in case of defect, would allow the passage of sewer air, shall be used, except for earthenware fixtures where the seal of trap is plainly visible.

Sec. 1120-79. Classification of Traps.—The traps which are permissible for use shall be classified as follows:

Class A. Plain or common traps, which class includes the various forms of pipe traps, as S. P. ¾'s bag and similar simple forms.

Class B. Resealing traps, which class includes modifications and combinations of plain and drum traps.

DRUM TRAPS.

Sec. 1120-80. Drum Traps.—Every drum trap shall be so installed that the water seal will protect the trap screw from sewer air.

Traps for bath tubs, basins, sinks, or other similar fixtures shall be made of lead, brass or of iron enameled inside.

Sec. 1120-81. Traps, Seal of.—Every trap shall have a water seal of at least two and one-half (2½) inches.

Sec. 1120-82. Traps Prohibited on Drains.—There shall be no trap at the foot of soil or waste pipes, nor upon the house drain or house sewer, except where one such drain or sewer is used exclusively for conducting rain water or surface wastes to a house drain or sewer.

Sec. 1120-83. Traps, Level and Protection.—All traps in a drainage or plumbing system shall be rigidly supported and set true with respect to their water levels, and shall be located so as to protect their seals from frost, back pressure or syphonage.

Sec. 1120-84. Clean-outs for Traps.—All traps, except those in combination with fixtures where the trap seal is plainly visible and accessible, shall, unless impracticable, be provided with clean-outs, on the inlet side or below water seal of trap or the top of the clean-out screw may be level with the top of the trap outlet.

Sec. 1120-85. Fixture Traps.—Every single fixture shall be separately trapped by a water sealing trap placed as close to the fixture as possible.

Sec. 1120-86. Traps Under Floors.—Traps placed between floors shall have a clean-out trap screw in plain view, either flush with the floor, or readily accessible from or under floor.

Sec. 1120-87. Strainers.—All fixtures other than water closets and pedestal urinals shall be provided with fixed strong metallic strainers over the outlets.

Sec. 1120-88. Overflow.—The overflow pipe from the fixtures shall in every case be connected on the house or inlet side of trap and so arranged that it can be easily and effectually cleaned and when a plunger plug is used the connection shall be made with a ground face taper joint.

Sec. 1120-89. House Drain—Clean-outs.—There shall be at least one (1) four (4) inch clean-out provided in the house drain made with a full size "Y" branch just inside of the wall near the house drain and house sewer connections, or at the base of the soil or waste stack correspondingly located. Intermediate clean-outs may be made with sanitary T's or Y's.

No point of the main drain, or of a principal branch, shall be distant more than twenty-five (25) feet in either direction from a suitable clean-out, so located as to afford access for cleaning purposes.

The clean-outs for roof leader branches on the house drain shall be on the traps.

Sec. 1120-90. Soil and Waste Pipe—Clean-outs.—(a) Every soil, waste and vent pipe stack to which access can not be had through the drain clean-out shall be provided with a clean-out as near its base as practicable.

(b) Any vertical soil, waste or vent pipe having an open end readily accessible from the roof and without change of direction in its entire length shall not be required to be provided with a clean-out other than that at its base.

(c) No point of soil, waste and vent pipe stack or branch except as above provided, shall be distant more than twenty-five (25) feet in either direction from a suitable clean-out, so located as to afford access to soil and waste pipes for cleaning purposes, and to vent to determine if they are obstructed. Any floor and wall connections of fixture traps shall be held a clean-out for these purposes. The access afforded through sanitary "T" fitting to the soil or waste pipe shall not be deemed sufficient unless the length of horizontal waste to be traversed is less than eighteen (18) inches.

Sec. 1120-91. Back Pressure Valves.—Automatic back pressure hinged valves and gate valves used on drains shall have gate and hinges of brass or non-corrosive metal. Horizontal automatic valves shall have on the outlet side an offset on the bottom of valve at least one-fourth (¼) its diameter, but nothing in this section shall be so construed as to prohibit the use of any other form of automatic valve, which employs balls or unhinged movable parts with equal efficiency and durability against back pressure.

Sec. 1120-92. Manholes.—All underground house traps and clean-outs inside of a building, except where the clean-out caps are flush with or above the cellar floor, shall be made accessible by manholes with proper metallic covers.

Sec. 1120-93. House Traps—Removed.—Hereafter when the house trap of any existing house drain having a properly vented soil pipe stack, becomes clogged or damaged such trap shall be removed.

TITLE VI.

GENERAL REGULATIONS.

Sec. 1120-94. Arrangement of Piping.—All piping shall be as straight and direct as possible and so arranged that it may be readily inspected during installation and accessible for cleaning and repairs. If any part of a house drainage or plumbing system is so located, or so constructed that obstructions therein cannot be removed without breaking pipes, such part shall not be concealed after being repaired unless provided with proper accessible clean-outs. No trap or clean-out shall be so placed as to be inaccessible or concealed.

Sec. 1120-95. Grade of Horizontal Piping.—All horizontal piping shall be run in perfect alignment and at a uniform grade of one-half inch per foot when possible, but in no case shall the grade be less than one-quarter (¼) of an inch to one (1) foot for soil or waste pipes, and house drains suspended by iron hangers or supported upon piers, posts or wall ledges, placed not less than ten (10) feet apart, and not less than one-eighth (⅛) of an inch per foot for vent or ventilating pipe, house sewers and underground drains.

Sec. 1120-96. Change of Direction.—All drainage and plumbing pipes shall be rigidly secured or supported to keep their alignment and grade and all changes of direction, either horizontal or vertical, shall be made with the appropriate use of forty-five (45) degree "Y's", half "Y's", sanitary "T's", long sweep quarter, sixth, eighth, or sixteenth bends.

Sec. 1120-97. Permissible Fittings.—Short TY branches will be permitted on vertical lines only. "T's" and short quarter bends may be used only on exposed waste pipe and in the vent or back vent system or for clean-out openings and fixture connections.

Sec. 1120-98. Prohibited Fittings.—No double sanitary T branches shall be used on horizontal runs, nor shall double hubs or straight crosses be used on the soil or waste pipe. The use of short roof increasers, bands, saddles or sleeves shall be prohibited in all cases.

Sec. 1120-99. Offset in Mains.—Offsets in the mains of all stacks shall, if practicable, be made with forty-five (45) degree fittings.

Sec. 1120-100. Dead Ends.—In the installation of any drainage or plumbing system, all dead ends in piping shall be avoided, and when any such system or part thereof, is reconstructed, remodeled, or in any way altered, all dead ends or unused parts shall, when practicable, be removed up to their branch connections and the openings for same shall be securely capped or plugged.

Sec. 1120-101. Drainage Excavations.—All excavations required to be made for the installation of a house drainage system, or any part thereof within the walls of a building shall be open trench work. All such trenches shall be kept open until the piping has been inspected.

Sec. 1120-102. Tunnels.—Tunneling for distances no greater than six (6) feet shall be permissible when unavoidable in yards, courts or driveways of any building site. When pipes are driven the drive pipe shall be at least one size larger than

Sec. 1120-103. Separate Trenches.—Each system of piping

Sec. 1120-103. Separate Trenches.—Each system of piping shall be laid in a separate trench provided that drainage trenches may be benched not less than eighteen (18) inches for lighter piping, if not in violation of any city regulation prescribed for their installment. Where a double system of drainage is installed the sanitary and surface house sewers or drains may be laid side by side in one trench.

Sec. 1120-104. Relieving Arches.—In all new work the walls shall be provided with relieving arches, thimble or lintels with a clearance of at least one (1) inch.

Sec. 1120-105. Stack Supports.—All free standing stacks shall be thoroughly supported on masonry piers at their base and those forty (40) feet or more in height shall be additionally provided with foot rests at their base and under offsets and floor rests or supports at every two (2) story interval. When a building is not divided into distinctive story heights such interval shall not exceed twenty (20) feet.

Sec. 1120-106. New Crock Sewer Connections.—When a length of an existing crock house sewer or drain is to be connected with, the whole length shall be removed and replaced by the new length, having a "Y" branch inlet of the required size.

TITLE VII.

HOUSE SEWERS AND DRAINS.

Sec. 1120-107. Independent Systems.—The drainage and plumbing system of each new building or new work installed in an existing building shall be entirely separate and independent of that of any other building; and wherever available, every building shall have an independent connection with a public or private sewer. See exceptions permissible.

Sec. 1120-108. Permissible Connections.—Where one building exists or is erected in the rear of another on an interior lot, and no private sewer is available or can be made for the rear building through an adjoining alley, court, yard or driveway, the house drain from the front building may be extended to the rear building and the whole will be considered as one house drain.

Sec. 1120-109. Connections with Cesspools.—When a sewer is not available, drain pipes from buildings may be connected with cesspools or receiving vaults as further prescribed in this Code, provided, however, that no water closet shall be connected to a leaching cesspool.

Sec. 1120-110. Private Sewers.—For the purpose of this Code that portion of the house-sewer or main drain which extends from the house or curb connection to the house drain connection on the side of a building adjoining a private alley, court or driveway, shall be deemed a private sewer. Such private sewers may be extended to receive the house drain connections of one or several buildings situated on the same building site of single ownership. Such building site may have but one (1) house connection if area drained is not in conflict with any other provision of this Code. Whenever a private sewer is to be established in any allotment, plans for such sewer shall first be submitted to the City Engineer for his approval and no such sewer shall be constructed or maintained unless the plans therefor shall have been approved by the City Engineer.

Sec. 1120-111. Old House Sewers.—Old house sewers or main drains can be used in connection with new buildings, only when they are found to conform in all respects to the requirements governing new sewers or drains, as prescribed in this Code.

Sec. 1120-112. House Drain Materials.—The house drain and its branches shall be of "Extra heavy" cast iron or of galvanized wrought iron or brass when above ground.

Sec. 1120-113. House Drain—Extent.—The house drain shall extend and be connected with the house sewer at a point at least two (2) feet outside the outer face of the footing of the foundation, vault or area wall of the building or outside of the building line, when such building has no regularly constructed cellar or basement.

Sec. 1120-114. Crock House Sewers.—Crock house sewers or private sewers shall not be laid within two (2) feet from or parallel with the exterior wall of any building.

Sec. 1120-115. Crock House Drains.—Crock house drains may be used in any buildings except dwellings and tenements, which have no regularly constructed cellar, provided such drain is covered with at least two (2) feet of earth above the top of the highest hub; but their use shall be prohibited within the walls of any new or existing building or part thereof containing vibratory machinery.

Sec. 1120-116. Crock House Drains and Leader Connections.—Where crock house drains are used, these portions of same receiving conductors in the inside of buildings at the grade shall be of extra heavy cast iron and said iron pipe shall extend at least eighteen (18) inches underground and be properly connected to the earthenware pipe.

Sec. 1120-117. Crock House Drains in Workshops.—Crock house drains may also be used in chemical works or laboratories or places using deleterious acids.

Sec. 1120-118. Crock Drains Repaired.—Crock house drains which were installed previous to the passage of the Code may be extended or repaired with earthenware pipe, provided, that such extension shall not be made to connect a new soil or waste pipe stack; but no such crock house drain or crock private drain or sewer within two and one-half (2½) feet of an exterior wall, when in a leaky or defective condition requiring repair for more than twelve (12) feet of its length shall be replaced except with cast iron pipe.

Sec. 1120-119. Crock Drains—Removed.—When by reason of adjoining excavations, crock house drains become exposed, such drain shall be taken up and replaced by extra heavy cast iron soil pipe.

Sec. 1120-120. Crock Drains—Use Prohibited.—Hereafter no crock drain shall be installed within the walls of any building, except those of the Fifth and Sixth Grades where the water from the main sewer is known to back up in the house drain above the line of the cellar bottom of floor.

Sec. 1120-121. House Drains.—Metal house drains shall be used in all cases within the walls of any building of the First, Second, Third and Fourth Grade, where there is a cellar or basement.

Sec. 1120-122. Calked House Drains—Prohibited.—Pipes with calked joints shall not be installed for house drains or stacks above the level of the cellar floor in any existing or new building subject to vibrations likely to loosen such calked joints.

Sec. 1120-123. House Drains Underground.—All house drains shall, wherever possible, be brought into the building underground below the level of the basement or cellar floor.

Sec. 1120-124. House Drains Below House Sewer Level.—Where house drains are laid below the level of the house sewer connections, they shall discharge into a sump, and be automatically lifted and discharged into the house sewer.

(To be concluded.)

LANDS GOOD-SIZED CONTRACTS.

The Hughes Heating and Plumbing Co., 1514 East Franklin Ave., Minneapolis, Minn., has been awarded the contract for the installation of the plumbing and heating systems in the six buildings of four apartments each, which the McGregor Real Estate Co. is constructing at Bloomington avenue and Thirty-second street. About 5,000 ft. of direct-steam radiation will be installed, together with 24 complete bath-room outfits, the same number of kitchen sinks, two laundries in each building, and all of the necessary gas-piping, water and sewer connections. Work has already been started on the foundations and it is expected that April 1st will find the buildings ready for the plumbing and the heating work. The Hughes company has a number of other contracts on hand, which, together with the above described work and the usual amount of repair and remodeling work, indicate that a busy season is at hand.

Nashville, Tenn.—Kennedy & Co. have secured the plumbing and heating contract for the Broadway residence of W. W. Dillon. This is one of the best contracts recently let, including three bath-rooms, each with shower over tubs, and individual lavatories for each bed-room. The house is to be heated with a hot-water system.

Duluth, Minn.—The McDougall Plumbing Co. has been awarded the contract for the heating system in the Hammel auditorium.

San Francisco.—Frank J. Klimm has been awarded the contract for installing the plumbing in the five-story building being erected on Sutter street, near Jones, by Robert Jones. The heating system will be installed by the Turner Co.

PURPOSE OF A FUSIBLE PLUG.

Editor "Domestic Engineering":—Is there any use in having a fusible plug, sometimes called a safety plug, in a low-pressure house-heating boiler? I wish that you would answer this and also some of those in the craft who have had experiences with the article mentioned.

L. M.

If the plug is so designed that it will melt at the degree of heat that is carried by the low-pressure boiler, we should prefer to see the plug inserted in the proper place in the boiler. If the boiler is run according to the instructions given by those who put in the job, the plug may never be required, but we should consider that there was always a chance at some time for the water to get too low and then would be the time when the plug got in its action. That has been our experience and we presume to say that we are not alone in the same.

ABOUT HANDLING AND SETTING MARBLE.

Editor "Domestic Engineering":—The information given in the following may be of interest to "A. J. H.," whose inquiry was printed in last week's issue of "Domestic Engineering":

Always bear in mind that you are handling marble and that it is a breakable article. When brought to the job, if not ready to install it, do not remove it from the crate, but store it in a safe place and in such a way as to protect it from possible mechanical injury. But before doing this, if not already done, it should be checked up to see that the quantity of material received agrees with the shipping list, and if possible take measurements of the slabs to see that the sizes agree with order slip. This can usually be done without completely uncrating the ware.

When left unprotected always leave it standing on edge; never on the flat, because it is less liable to be broken when standing on edge. At all times keep all substances containing oils well away from marble, because marble will, as a rule, absorb oils and thus cause a stain that will show.

When drilling always start the drill from the finished side of the slab. If drill is started from the unfinished side, it may chip and burr where the drill goes through on the glazed surface, thus showing a break where it will be seen.

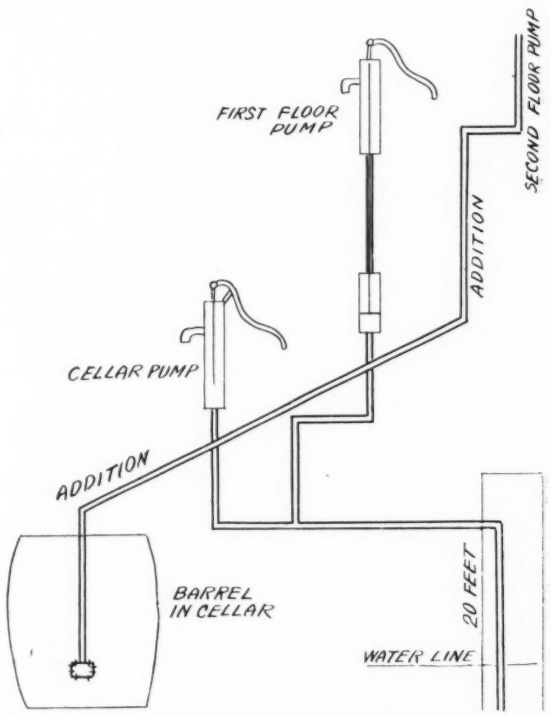
To assist the drill to cut rapidly keep the marble moistened with water at the point of drilling; a good scheme is to tie a piece of rag or sponge to the drill. Keep this rag or sponge well wetted; then the water will trickle down the shank to the point of the drill. When setting marble be absolutely certain to see to it that the floor slabs are set on a perfectly solid foundation, using the level to see beforehand that the foundation has the correct pitch or that it is perfectly level as required; no foundation that will allow the slab to rock should be allowed.

Plaster of Paris is not a suitable material to use for making up joints in marble, because it is not a non-absorbent substance, and it is liable to turn black or dirty after use. For the purpose of filling up the joints use a composition of litharge and glycerine; this composition may be colored if desired. Try this and you will find it to be a success.

N. Y. A. W.

HOW "HAYSFE" RAISED THE WATER.

Editor "Domestic Engineering":—A few weeks ago I fixed up a job which I believe would be of interest to the readers and so send you a sketch. The well was 20 feet deep before the water was touched. There was a pump in the cellar which worked as a suction pump all right.



On the first floor the pump was a lift, lifting from the same height as the pump in the cellar.

I told the owner that we could use a force-pump and tank but that was too expensive to suit his tastes and so I thought out a way which I don't know as to whether it is good, fair or fierce, but it did the work. I put a barrel in the cellar, which is filled from the cellar-pump. The pump on the second floor is connected to the barrel. The owner fills the barrel and the wife can then draw water at leisure according to the plan shown.

New Bedford, Mass. "Haysee."

REGARDING THE SIPHON.

If the constant reader from Des Moines, Ia., who signs himself "J. D.," will communicate with the editor and give his name and address, we shall take pleasure in giving him some information which will be "pat."

Editor Q. & A. Dept.

PROPORTIONING STEAM-MAINS.

By A. J. Purcell, C. E.

Hark! Did I hear some one say "Chestnuts?" Yes, I know this subject was pretty well thrashed out about three years ago, when some 27 different people in the trade had their say as to what was right. E. R. Pierce, who is now writing the plainest and clearest article on the heating question that I have ever read, has also a good deal to say about steam mains and their sizes.

Yet there is one little detail that I think has been left out in the explanation, that was puzzling to me once. I thought it might be to some others yet, so I am going to try to explain the point in this article, and I hope to make myself clear to my readers.

We notice when we read a table or rule on "sizes of mains" that it states: "based on length of 100 ft. of straight pipe." Now we are confronted with the question: In measuring up a line of steam-main, where is the starting and stopping point?

I have made three sketches to illustrate my point as per Figs. 1, 2, and 3. In Fig. 1, we have the radiator containing 100 sq. ft. set 100 ft. away from the first opening of the boiler to its supply-end; a 2-lb. pressure at the boiler; radiator-outlet 36 in. above the water-line of boiler; mains covered; one-pipe system; end of main dripped and return carried back to boiler wet. The above conditions are to be the same in Figs. 2 and 3.

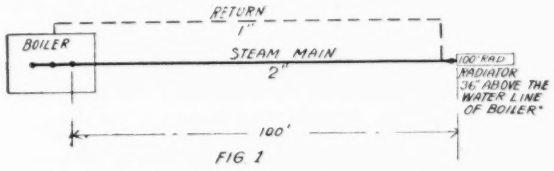


FIG. 1

one that is laying out the mains. What is the length of the steam-main in this figure, 100, 150 or 200 ft.? Some argue that the first 100 ft. only is main and that the second 100 ft. is branches. Still you must admit that the steam has to travel the whole distance, and that the distance is 200 ft. from boiler to radiator branches. You may argue the first 100 ft. is taken care of in pipe-size, because you have made it large enough in the first place to carry the 100 sq. ft. of radiation, and all you have to do now is to provide two 50-ft. runs to handle 50 sq. ft. each, which according to the table is 1¼ in.

Let us see if we are correct in this supposition. The first 100 ft. has to enter the side-inlet of a tee, which is equal to 60 diameters of a 2-in. pipe, or 120 ft., which is

In Fig. 1 we have 100 ft. of pipe and 4 elbows or their equivalent. The usual size of pipe for this size radiator is 1½ in., so we will figure the 4 elbows as 1½ in. and allow 40 diameters for each elbow, to get its equivalent in straight pipe (as per the table prepared by A. R. Wolff), 4 times 40 equals 160, 160 times 1½ equals 240 in., or 20 ft., so the length of the main plus the friction equivalent is 120 ft. Therefore, to be on the safe side and not give us too much velocity in our main and an increased friction that will cause too big a differential at the return end, we take the next size larger pipe, which is 2 in.

In Fig. 2 we have divided the radiation into two 50-sq. ft. radiators and set them 100 ft. apart to the right and left of the position in Fig. 1, being 50 feet each way, and exactly at the end of the first 100-ft. run of main.

Now comes the point that is not always clear to the equal to 10 ft. Then we have the equivalent of three 1¼-in. elbows at the end of each 50-ft. run, which is equal to 40 diameters of 1¼-in. pipe 6 times, or 25 ft. Hence, our second run of 100 ft. is 125 ft., plus 110 ft., making a total equivalent of pipe 235 ft. for the steam to travel in. To obtain the right size, this allowance must be made so that we will not have too great a drop in pressure at the return end. We find that the two

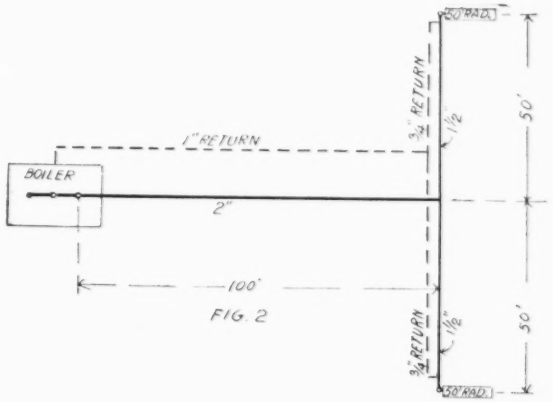


FIG. 2

50-ft. runs must be 1½-in. pipe up to the radiator branch, and the first 100 ft. can still remain 2 in., as this size will supply 100 sq. ft. of radiation a distance of 300 ft. of straight pipe or its equivalent.

In Fig. 3 we have extended our pipe line 50 ft. further on each side, adding another 100 ft. to our total pipe-line and to our steam-travel we have again split up our radiation, so that we now have the 100 sq. ft. in four 25 sq. ft. radiators.

Our first 100 ft. shows the same friction-head as in Fig. 2. The second shows two 1½-in. ells, which is equal to 40 diameters times 1½ = 120 in. or 10 ft. The third 100 ft. has the same friction-head that we had in Fig. 2 at the end of the 1¼-in. lines and is therefore equal to 125 ft.

Our totals for Fig. 3 now reads: 110 ft., 110 ft., 125 ft., total 345 ft. So our first 100 ft. must be 2½ in., the

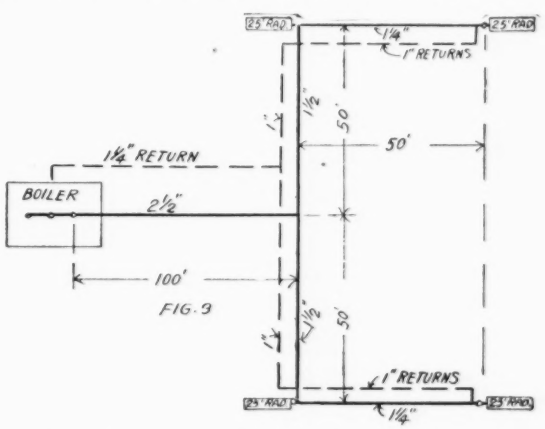


FIG. 3

second 100 ft. must be 1½ in., and the third must be 1¼ in.

It is to be understood that all pipe-ends must be reamed out full size of pipe-bore, with a taper-reamer.

With these pipe-sizes we ought not to have over ½-lb differential in pressure at the extreme end of the steam main.

I know some one will cite cases where they have used much smaller piping in some similar case, but, kind reader, did you ever put a gage on the return of that system and note the difference in boiler and return-end pressures? Also you must know that friction-head, caused by differentials, eats up the coal pile faster than the job that has larger piping and no differential to speak of.

Larger piping costs more to install, but your customer will pay the difference in cost if you go to him in the right spirit and tell him it will save him so much coal each heating season. Try it once.

NEW ENGLAND NEWS.

Providence, R. I.—The Master Plumbers' Association, believing that plumbers should be permitted to bid upon city work directly instead of through general contractors, has brought the matter to the attention of Mayor Henry Fletcher through a committee made up of Thomas E. Manney, Joseph Appleton, and former Alderman John C. Dunn. Following the conference, the committee filed a written request for a hearing by the Board of Contract and Supply. The action was brought to a focus by the advertisement for bids upon the Courtland street school enlargement. The master plumbers ask that the plumber be named in the award on bids to general contractors, as it is held that otherwise liberal competition is shut out. The master plumbers claim that as taxpayers and citizens of the city they are entitled to the same consideration that is paid the general contractor.

Taunton, Mass.—Eli Wordell & Son have the contract for plumbing in the residence of Clement H. Nash, on Post Island. The contract is a large one.

Lowell, Mass.—E. A. Lynde has the plumbing contract for the 13 cottages which Jacques Boisvert is building on Farmland and Cumberland roads. Each cottage is to have five or six rooms and bath and all modern improvements.

Terryville, Conn.—Joseph Smith has moved his plumbing and stove business from South Main street into the new Cook block on Main street.

Rutland, Vt.—Guy W. Pratt has been awarded the contract for the installation of the plumbing, heating and ventilating systems in the new addition to the Rutland City Hospital.

Marlboro, Mass.—William H. Hill, former president of the Massachusetts State Association of Master Plumbers, has the contract for installing a heating plant in the Sisters' Home on the grounds of the Church of the Immaculate Conception. He has just completed installing a heating plant in the Universalist Church.

Nantucket, Mass.—Lincoln Lewis has engaged in the plumbing business on South Water street.

Westville, Conn.—The Coe & Coleman Co. has purchased the plumbing business of Robert Lattin on Whalley avenue.

Rutland, Vt.—Dunn Brothers have the contract for heating and plumbing the new addition to the Clement National Bank building in that city.

North Adams, Mass.—G. R. Cook, plumber and tinsmith, has opened a place of business on West Main street.

Marlboro, Mass.—George R. Hall & Co., plumbing and heating contractors, have recently completed a number of large contracts, among them a plumbing contract at the Diamond O shoe factory; and plumbing in the residence and factory of Frank Billings, besides numerous other jobs, some of which they still have in hand.

Fall River, Mass.—The contract for heating apparatus for Stone Bridge Cottage has been awarded to the Fall River Steam & Gas Pipe Co.

Eastport, Me.—James J. Daley, plumber, has a contract to install a Mianus engine and fittings in the three-masted schooner "Winnegance," owned by Pike & Peacock and used for carrying coal.

Fitchburg, Mass.—Judge Thomas F. Gallagher has been appointed receiver of the Cleghorn Plumbing Co., of that city, by Judge Richardson, sitting in the equity session of the superior court at Boston. The action was the result of a bill in equity brought by Charles and William Garceau, partners in the Cleghorn Plumbing Co., against August Fournier, treasurer of the company, to restrain him from collecting or receiving any funds owed the company and from disposing of any property of the partnership. A permanent injunction was granted.

New Haven, Conn.—Charged with forgery and uttering forged documents, Joseph A. Martingano, a plumber doing business at 120 Hamilton St., has been held to the superior court. Martingano is alleged to have secured plumbing supplies from the C. S. Mersick Co. by signing the names of other merchants to the order blanks. The defense was that this was done in order that he might obtain the discount usually given to these merchants, which was better than that given him.

Westbrooke, Me.—The board of health has gone on record in its annual report as in favor of the enactment of a state law compelling all cities to appoint a plumber inspector, in order that both master plumbers and journeymen may be protected in their trade.

WORK ON LOS ANGELES PUBLIC-COMFORT STATION BEGUN.

The Park Commission of Los Angeles, Cal., has commenced the excavation for the erection of a public-comfort station in Central Park in that city. The work will be done by the day. The building will be constructed underground, with two granite stairways from Hill stret. It will be 32x63 feet and will have reinforced concrete outside walls, reinforced concrete roof and hollow tile interior walls. The specifications call for vitreous tile floor, white Italian or Alaskan marble partitions in toilets and wainscot on walls to a height of 7 ft. 4 in.; oak sash, chipped plate glass, marble casings, French plate mirrors, bronze handrails, electroplated wrought iron grilles, artificial stone curb around stairways, tile walls in stairways.

AN ACT TO AMEND THE GENERAL CITY LAW, IN RELATION TO PLUMBERS IN NEW YORK STATE.

An act to amend the general city law, in relation to plumbers has been introduced in the assembly of the state of New York by Mr. Dawson, of Buffalo. The bill amends Sections 42, 44, 45, 46, 47, 49, 55 and 56 of Chapter XXVI of the laws of 1909, entitled "An Act in Relation to Cities, Constituting Chapter XXI of the Consolidated Laws," which at present provides only for the examination and licensing of persons desirous of engaging in the business or calling of plumbing as employing or master plumbers.

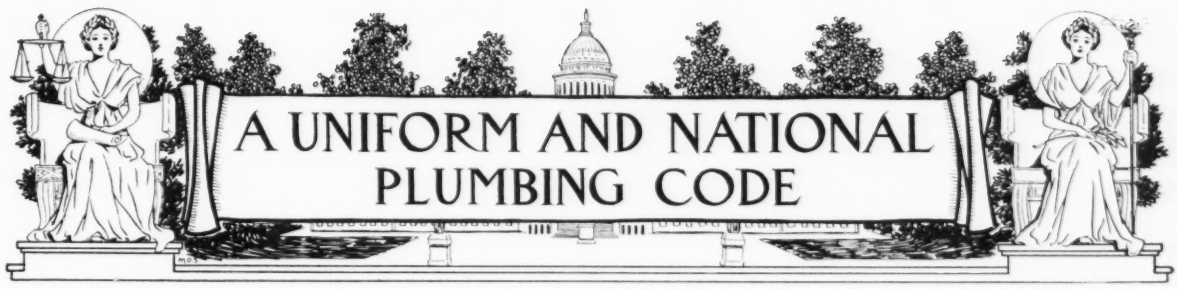
The amended law provides as well for the examination and licensing of persons desirous of installing or repairing plumbing work as journeymen and the issuing by the examining board of certificates of competency to those who pass a satisfactory examination, and it is further provided that examinations for both master and journeymen plumbers shall be practical as well as theoretical.

Certificates shall be of two grades, one for master or employing plumbers and the other for journeymen, and in no instance shall the certificate of a journeyman entitle him to act in the capacity of a master or employing plumber. Either certificate will qualify the holder to act as inspector of plumbing, in the event of appointment, without further examination.

Before a licensed journeyman can apply his vocation as a journeyman plumber it will be necessary, as already required of the master plumber, that a certificate of registration be acquired by him from the local board of health.

For violations, in addition to revoking certificates, as now provided, a fine of not less than $5 nor more than $50 may be imposed for each and every offense by the proper authorities.

The act, should it become a law, shall take effect immediately, except that the time within which journeymen plumbers must obtain certificates of competency is extended to September 1, 1911. It is now in the hands of the Committee on Affairs of Cities. A hearing will take place for consideration of the measure on a date to be named by the committee.



By Henry D. McCormack, C. E.

VIII.

Connections to Drains.

It would seem hardly necessary to specify explicitly just which kind of joints, branches or fittings would be acceptable in a city of sufficient size and importance to boast of a plumbing-code, yet experience has taught that if any leeway is given in the matter an opening is left for the entering wedge of shoddy work with cement and putty joints, and the obnoxious saddle-hub fitting. It is not through ignorance of what is good and what is bad in plumbing practice that such poor work is done, but because it seems quicker and cheaper to a certain class of plumbers to knock a hole in the main-drain, stick in the hole the end of a branch pipe to a fixture, patch it with Portland or natural cement, or swathe it in bandages bulging with putty where strings or wires crisscross the bandages, than to break out the line and insert the proper fitting. Even on new work certain plumbers through ignorance or cupidity would use unsuitable fittings, if they were not kept everlastingly in the right path by stringent plumbing laws and vigilant inspectors.

Supports for the Drainage System.

We now come to a very important consideration in the planning of plumbing, and one which, unfortunately, has not been given the consideration it merits by those charged with the compiling of plumbing codes. That is, the providing of suitable supports for the plumbing system which will so adapt themselves to conditions as not to add to the strains when settlement occurs. In New York City the code reads:

"All pipe lines must be supported at the base on brick piers or by heavy iron hangers from the cellar ceiling-beams, and along the line by heavy iron hangers at intervals of not more than ten feet." San Francisco dismisses the subject with the following section: "Section 24. Where practicable, iron sewers, drains, soil, waste and leader pipes running in a cellar or lowest story of a building should run along the walls of the building, or, if this is not practicable, be hung on iron anchors of sufficient strength, or suspended from the ceiling in a proper manner by anchors, or otherwise securely supported at every joint."

Before we can analyze these several requirements to find out in what respect they are lacking, we must first understand just what to provide against when the stacks are supported from the building. To analyze the subject, we must first divide buildings into two primary classes: Simple frame buildings and tall sky-scraping buildings. In the extremely tall buildings more generally erected for office and industrial purposes, a tremendous load is imposed on the foundation footings. These, unless carried down to bed rock, which is seldom the case, are supported on piles or on footings which are spread to cover a large area so as not to impose too great a load upon the soil. In spite of these precautions, and the further fact that a liberal margin of safety is allowed in all cases when designing footings, it may be stated as a rule that all buildings sink more or less into the soil on which they are erected. The various cities having building-codes specify the maximum amount of load that can be imposed upon the soils, yet it is estimated that with the loads authorized by the building department of Chicago the settlement of buildings, due to the compression of the soil, amounts to from three inches to five inches.

As far as the settlement is concerned, it does not affect the stability of the building so long as the settlement is uniform. But it does affect the piping if not properly supported. Take for example the case of the New York plumbing-code, which requires the stacks to start from brick piers located in the cellars. Unless these piers are nicely proportioned to carry exactly the same weight per amount of area as the foundation walls, a condition that is not likely to be carried out, then the building will settle naturally, while the stacks would remain in place supported by the piers, unless forced down by structural parts of the building pressing on the branches. If the stacks and drains are forced down by pressure of the settling building, there is no question but that damage will inevitably result, and in this case, as in all others, the ounce of prevention, that is to rough-in and support your pipes so that they will all move uniformly together, or else be entirely independent of each other, is the best plan to pursue, and far better than the pound of cure.

If the horizontal system of drains in the building is supported above the floor-line of the cellar, the stacks can be supported where they turn up by means of strong iron hangers, designed to carry the entire weight of the stack and branches, attached to both I-beams overhead. Or, where the stacks turn up close to a bearing wall, they can rest on corbels, built into the walls; then when a settlement occurs, the entire system of piping, both horizontal and vertical, will move with the building properly, and when the building finally comes to rest at the lower level, the parts will still retain their relative positions.

The foregoing is only when the settlement of the building is uniform throughout the entire extent of the foundation walls. When the settlement is unequal, as is generally the case, as is attested by cracks of plastered walls, and tile-flooring in so many buildings, then while there is a general downward tendency, the movement is not uniform throughout the system. It is to provide for just such contingencies that experienced plumbers on big work provide swing-joints at all floors of the buildings, where batteries of fixtures are to be taken off, and interpose a number of fittings so that when the inevitable settlement occurs, there will be sufficient "spring" or "give" to the piping to take up the movement, without breaking the stacks or fixtures. That is one provision that ought to

be taken care of in a plumbing-code, and so far as the writer knows is entirely overlooked.

Where the horizontal system of drains is bedded in the earth beneath the cellar-floor, on the other hand, it occupies the same position in respect to settlement as when the stacks are supported on brick or concrete piers. When the settlement of from three to five inches occurs, it is the walls, floors and general structure of the building which sink, while the cellar-floor and the pipes embedded therein retain their original elevations. It is obvious, therefore, that in such a case something must give, or the building could not settle, and in every case it is the soil stacks and branches.

Another point to consider is the way the stacks are supported along their vertical length. There is only one logical way to do this, and that is to support the stacks at intervals, say at each tier of beams, on rests which will hold the pipe in place, support it from settling, but allow it perfect freedom to move upward if necessary to do so, due to a settlement of the building without a corresponding settlement of the drainage system. Then all the fixture branches should be kept clear of structural parts of the building, and be so roughed-in that as the stacks are raised relative to the building, by a settlement of the walls and floors, the branches would adjust themselves automatically to the new condition of affairs so that no damage would result.

What we want to require, then, in the new code is a system of supports for the vertical pipes which will hold the stacks firmly sidewise, will not allow them to settle, but will allow them freely to move upward in the hangers. Supports for the vertical piping in the cellar or basement, when not buried in the ground, which will insure the system of piping and the building settling together, and, where the system of horizontal piping is buried in the ground, a complete detachment from the building walls proper, so that in case of settlement the pipes will simply move upward in their support, at the various floors. Lastly, roughing-in of the branches to batteries of closets and other fixtures in such a manner as to provide for a raising or lowering of the stacks, without damage or injury to the piping or fixtures.

When compared with these requirements, it will be seen that not any of the provisions in the codes mentioned comply at all with what will be necessary in the new national code; and in the case of the Minneapolis code, it simply shifts the burden to the already overloaded plumber by requiring him to provide anchors of "sufficient strength," suspended in a "proper manner," without letting him know what that "sufficient" and "proper" are.

It might be well here to digress long enough to touch upon that very subject. In compiling a code, whether the national code or one for some struggling municipality, let everything be clear and explicit, and definite sizes, proportion and methods be given. That is what the code is provided for and is supposed to do; and there is not a case where the required data cannot be worked out beforehand and stated in definite terms and measures. The requiring of work to be done in an "approved" manner with "sufficient" capacity or strength and "properly" arranged, or any other such vague indefinite expression, is simply confessing that those who had the work of compiling the code in charge found the undertaking beyond their ability and resorted to vague wording to throw the burden of doing the work right on the plumbers, leaving a loophole open for themselves so in case of failure they could claim the work was not "properly" done, with "sufficiently" strong material, and was not "approved" by the powers that be. Let's have none of that!

So far we have considered only the cases of tall buildings of masonry and steel. We will now take up the case of small frame buildings. Buildings of this class are seldom more than three or four stories in height, are correspondingly light, and, if the footings have been properly proportioned, it is safe to assume that seldom do they settle perceptibly on account of compression of the soil under their footings. But what they save in settlement, they lose to a great extent in another way, namely, shrinkage. At the present time it is almost impossible to get seasoned rough building material. That which is used in the average frame building is green and sappy. Even if it should happen to be dry and seasoned, by the time it had found its place in the new structure rains would have wet it, or by the time the plasterers finished their labors the once dry timber would be found to be saturated and swollen. While in this condition the floors are laid, the plumbing fixtures set, and the building is ready for occupation. But the timbers dry out and shrink in the course of time, and, as 10-in. and 12-in. joists will shrink from one-quarter to one-half inch, it is equivalent to the walls and floors of the building settling that much, the stacks and branches retaining their original positions. Sometimes the branches to the water-closets are so flimsily installed that the pressure or weight of the fixtures when in use forces the closet base down to the floor-line, with detriment to the piping or joints below. At other times the closet is held above the floor-line a distance equal to the settlement or shrinkage. In the new national code, then, let there be a requirement for adjustability or flexibility in the connecting up of fixtures resting on the floor, through which the waste or soil-pipe projects. This can be accomplished by means of swivel-joints, swing-joints, telescopes or any other means that will provide for the settlement of the floors without damage to the piping or fixtures. Many cities have taken up the study of this matter, and have called for more or less successful remedial measures. Cleveland, for instance, requires that: "In wooden floor construction, where there is danger of settlement, due to seasoning shrinkage, all connections of earthenware water-closets to the soil-pipe should have at least two inches of lead pipe between the wiped-joint and the underside of the floor."

The provision, while well intended and a step in the right direction, was nevertheless unsatisfactory and has been found so in practice. The trouble is there is little more "give" to a straight piece of four-inch lead-pipe two inches long than there would be to a piece of iron-pipe of the same size and length, at all events within practical limits. What is wanted is a member that will yield under a weight or pressure of about 250 pounds. That allows 100 pounds for the closet, and 150 for the user, and the combined weight will keep the closet-base firmly down on the floor. It would take probably a two to four-ton weight or more to buckle a piece of four-inch lead-pipe two inches long, enough to make up the one-quarter or one-half inch shrinkage of floor joists, and Cleveland has not been relieved of her old trouble by that requirement. At the present time those interested in the subject are considering the requiring of flexible lead connecting-pieces. (To be continued.)

Norsk Pattern.

Little Sigrid was born in America, of Norwegian parents. "What is your nationality, Sigrid?" asked the teacher. Sigrid tossed her flaxen braids. "I'm an American of Norwegian design," she said proudly.—Harper's Magazine.

BUSINESS MANAGEMENT

NEW METHODS FOR OLD

THE INSPECTOR OF PLUMBING.

Editor "Domestic Engineering":—I have seen quite a lot of stuff, pro and con, about the plumbing inspector. I wonder how many of them are authorities on sanitary matters? It is very probable that most of them know the mechanical part of the trade all right, for many of the inspectors are men who have at some time or other carried the tools for a greater or less length of time. But aside from the tools there is a vast field of knowledge to be acquired (even at this early stage of the science) and the question is, how much do our inspectors know of this store of wisdom? Now it seems to the writer that a man who has to do with the say so as to how the plumbing shall go in (subject to the ordinance, of course, but in many cases the same ordinance is capable of being construed in different ways), that such a man should have the whole shooting-match at his command and not be so insufficiently posted that some bright business man or doctor can rise to the occasion and give him points on the technical, or perhaps I should say the scientific, part of the game. We certainly need more leaders in our ranks, men who are big enough, as far as mental powers are concerned, to grasp the situation and fit themselves to meet the needs of the day. We have heard the deuce of a lot for the past few years about the practical man and all that he could and would do; but, in most cases, he ends by remaining merely a practical man and rises to no greater height. As far as the practical part goes, it is all well enough, but more is required. Shall we have it? Will the parties concerned get into the game? Time will tell. Read these lines, "Michigan," for you wanted me to give out something other than the tri-trade man dope. Come to it, old boy, and give us the sign of your mit. "Lead Pipe."

"DEACON DODGER" ON DECK ONCE MORE.

Editor "Domestic Engineering":—Haven't had a chance to get in a word in the paper for some time. Been down South getting new health and acquiring a more vigorous constitution to keep up the fight for the next few years. Well, when I got back and down to the shop, about the first thing I did was to pick up the papers from the file and go through the various departments. Say, they have been having the dickens of a time. Those men from the Northwest certainly have "ginger" all right, and the "Michigan" party sems to have a sore head sure enough. When he has put in as many years as your old Dodger, he'll then know that a good bright genius can work 20 years at one trade—and then not know it all by a long shot. But that don't cut much ice anyway. What I'd like to know is how the boys are trimming their sails for the future. You see, way down in the land of cotton, I had a chance to do some thinking, and thinks I to myself "what's the use of working like a blamed slave all one's life and having only a few hundred dollars at the end of it?" I spent a good share of my profits for the past few years on this trip for my health and I have come home with the determination to "put my house in order" and the first thing that I shall do is to "make a cleaning" and make it of such a character that it will last as long as I shall care to stay in the business. Now I can tell you, one and all, that the next five years have got to bring to your old Deacon some of the good mazuma for his efforts and I hope that many others will arrive at the same conclusion. Will write some more when I get "squared away." "Deacon Dodger."

ADVISES EMIGRATION.

Editor "Domestic Engineering":—I see that "G. G." in the issue of February 25 wants to know what he should do, with respect to business, when the town that one is in gets all "filled up with plumbing and heating and no new work in sight."

I'd emigrate from that burg in one night. That I would. If I had a wife and family and the spondulix was shy, I'd give it all to her and go on the war-path alone and I would stick to it until I found work and an opening. This setting down in a dead town and waiting for something to happen, that you know very well never can, yet remaining and stuffing up your conscience to believe that the lightning might strike, is a mighty hollow mockery.

There are places in this big land where they need men. Perhaps it might not be in the plumbing business; but what of that? A good bright and reasonably strong and healthy plumber has as good a chance to succeed at most anything in the ordinary run of affairs as has any other man not specially trained; and hundreds of such men do succeed. Why not our friend of the dead town and the lonesome countenance? Get a move on, friend, as spring approaches. Move out and seek for better fields and greener pastures.

From One Who Moved.

SOME PRACTICAL QUESTIONS.

Suppose that you had a son about 20 years of age; perhaps a year or two younger, or maybe a year or so older than that, it doesn't matter. Now the boy has been through the high-school and wishes to come into the office with the view of acquiring a knowledge of the business. What would you do with him?

1. Would you insist that he go into the shop and learn the trade?
2. Would you prefer to have him get more education, and so send him to some college?
3. Would you send him to a trade school?
4. Would you send him to some business college?
5. Would you take him right into the office and attempt to teach him the business yourself?

These are questions that many of the master plumbers have to answer, at some time or other, and we should be pleased to hear from some of you as to just what course you would (or did) pursue in the matter.

What Aroused His Curiosity.

"Beg pardon," said the hotel clerk, "but what is your name?" "Name!" echoed the indignant guest, who had just registered. "Don't you see my signature there on the register?" "I do," answered the clerk, calmly. "That is what aroused my curiosity."—Chicago News.

Plumbing in the Laundry

A Complete Guide for the Plumber and Householder

By Henry D. McCormack, C. E.

Location of the Laundry.

The ideal location for a laundry in a private house would be on the first floor of the building, or better still, in a semi-detached wing of the first floor, so the odor of soapsuds could not be carried to all parts of the household. Locating the laundry on the first floor of a building has the advantage of easy access, and makes easy the wheeling of laundered clothes to the yard for drying. Unfortunately, however, the ideal is seldom attained in this respect. In the larger cities, the houses are generally crowded together, often with party walls between, and the yard space is so limited that room cannot be had for a separate laundry on the first floor. In the smaller cities where the style of houses is different from the city buildings, the laundry is only part way underground, and it doesn't seem worth the extra expense to increase the size of the house to accommodate a laundry on the first floor of the building. Ordinarily, then, the laundry in private homes is located in the basement, and when the modern type of buildings is considered, perhaps no better location could be found. In most houses the laundry is used only once a week and there seldom is a place within the rest of the building which could be set aside for use only on that day and lay idle the rest of the time. Economic design of homes now requires that every available bit of space be of some use at all times. Further, in the laundry, soiled clothes can be kept as they accumulate between washings, and such clothes as require this treatment can be kept in soak within the tubs.

By locating the laundry in the basement, less care need be exercised to prevent splashing the walls and floors of the building, for it is assumed that wherever the laundry tubs are placed the walls and flooring are impervious and non-absorbent, whereas if placed on the first story of a building and resting on a wooden floor, the alternate wetting and drying might damage the flooring or soak through and damage goods stored in the basement below.

An additional convenience of locating the laundry in the basement lies in the fact that a clothes chute can be installed so that clothes from every floor in the building above the level of the basement can be dropped into a receptacle located in the laundry. This feature alone is a consideration not to be ignored in a large home, particularly if there be four or five floors to the building, for the saving in steps carrying soiled clothing to the laundry, as well as avoiding carrying soiled clothing through the house, are sufficient considerations to warrant installing a clothes chute.

When the laundry is located in the basement of a building, great care must be exercised to partition it off from that portion of the basement occupied by the steam boiler or hot air furnace, and containing the coal for range and heater. Coal dust and fine ash dust are very penetrating and will sift through the smallest of crevices and as during stormy weather the laundry must be used for drying the clothes as well as for washing, it is absolutely necessary that it be kept free from dust or dirt which would soil the clothes after they had been washed.

Location of Laundries in Apartments.

The location of laundry trays in apartment houses presents a different problem from the location of the laundry in a private house. In apartment houses, the entire living apartment of a family is on one floor and necessarily the laundry trays must be located on that floor. The provision for laundering clothes in an apartment house differs from that of a private house still further by the fact that no provision is made within a flat or apartment for drying clothes in the house. In the cheaper flats clothes lines running from the kitchen window to a tall clothes pole in the yard are the only means provided for drying, while in the better class apartments clothes lines are provided on the roof of the building.

In the class of buildings under consideration the laundry trays are located in the kitchen adjoining the kitchen sink and to economize space the covers are made so they can be used as table space. In this manner the tubs are utilized at all times whether washing is being done or not. In some of the most expensive apartment houses, as well as in family hotels, in addition to the laundry trays located in the kitchen, a separate laundry is provided in the basement, where the tenants can have their laundry work done by their own laundress.

Location of Hotel Laundries.

Hotels are now equipped with a complete laundry which is located in the basement of the building. These laundries, in addition to a battery of stationary laundry tubs, fitted with hot and cold water and connected to the drainage system, are completely equipped with modern machines for sterilizing, boiling, washing and ironing the clothes. These laundries are operated by power and are as complete in every detail as any commercial laundry. They will be illustrated and described later in this series.

Lighting the Laundry.

As most of the laundry work in private houses is done in the day time, the laundry should be located on the outside walls of the building and the foundation pierced with numerous windows to admit light to this apartment. Further, the laundry trays should be located on this outside wall under a window or windows so that plenty of light will flood the clothes being laundered, thus enabling the laundress to determine whether or not they are clean, and to soap and rub the parts that remain soiled or stained. If the tubs for any reason cannot be placed along the outside wall near a window, reflectors should be used to reflect the light where wanted, and if the windows be small, the laundry deep or dark, prismatic lights can be used to good advantage in the windows to deflect light into the rooms.

In addition to daylight, artificial light must be provided so work can be done in the laundry at night if necessary. Whatever the light used might be, electric, gas or oil, it should be so disposed that plenty of light will be available wherever work must be done. This would necessitate lights at the laundry trays and at whatever point in the laundry would be most convenient for an ironing board. Should the laundry be equipped with a drying rack, as many laundries are, a light should be located so the condition of the clothes can be observed by pulling out a rack.

Floors and Walls for Laundries.

The walls and floors of laundries should be impervious to water and should be non-absorbent, so that they will not absorb the watery vapor which rises from the trays and condenses on the wall and ceilings, thus becoming saturated and giving rise to must and mildew. Cement makes a good cheap flooring material for the less expensive buildings, and when properly laid will last a lifetime without cracking or checking. In laying the cement floor, a foundation of concrete mixed in proportion of one cement, 3 sand and 5 stone should be provided. Over this, laid in blocks about 4 feet square, should be a top dressing 1½ inches thick, mixed in the proportion of one Portland cement, 2 good clean sharp sand. The blocks should be laid alternately with tar paper between the joints or a ¼ inch strip of wood can be laid between the blocks while the cement is being laid and after the flooring has set, the strips of wood can be removed from between the blocks and the spaces thus left filled flush with the floor with asphalt. These joints will be perfectly watertight and at the same time provide room for expansion and contraction so the flooring will not become cracked or crazed. A base of cement about 1 foot high should also be laid and the angles where the base touches the floor, also at the corners of the room, should be neatly rounded so no crevice will exist to catch dirt or offer a hiding place for bugs. Asphalt is a very suitable material for the floor of a laundry. It is elastic, non-absorbent and impervious to water, besides having the property of adjusting itself to slight ranges of temperature without cracking. It is more expensive than cement, however, but compensates for the greater cost by being softer to walk upon, a condition worth considering, for the hard, cold feeling of cement and tile floors is often found objectionable by those who use them. A base of concrete must always be laid for an asphalt floor to be laid upon.

Tile flooring possesses the advantages of being smoother than either cement or asphalt, is less absorbent than cement, is cleaner looking than either of the two materials previously mentioned, and can be laid in a variety of pleasing designs. Floor tiles are further desirable on account of the ease with which they can be cleaned and the fact that all organic matter can be removed by washing and scrubbing, as the tile possesses little or no suction to absorb moisture. Tile flooring possesses the disadvantages, however, of having joints which are filled with a porous and absorbent material, and of being laid in a material, cement, which will not allow for expansion and contraction, consequently tile floors often crack, thus presenting a yawning crevice to catch and hold filth. The objections are so far outweighed by the advantages of tile, however, that a tile floor is considered about the best which can be laid in a laundry. If there is a material which is more suitable for laundry floors than is tile, the material is interlocking rubber tiles. Interlocking rubber-tile floors are made in as great a variety of designs as are vitreous tiles; they are soft to the tread, do not draw heat from the feet, thus making them cold, are impervious to water, easy to keep clean and are very durable. The first cost, however, is very high, being one dollar and fifty cents per square foot, added to which must be a flooring of cement, asphalt or wood for the tiles to rest upon.

In finishing a laundry it is well to avoid the use of wood as much as possible. Wood becomes saturated with moisture, swells, cracks and twists, thus opening crannies for dirt and bugs to lodge in. What woodwork there is in the laundry should be protected from moisture as much as possible, and the walls and ceilings should be painted so moisture cannot soak the plaster. Openings from a laundry leading to other parts of the house should be provided with tight-closing doors to prevent the penetrating odor of suds and the general odor of washing from reaching the living rooms. In large laundries where a considerable amount of water is daily splashed or spilled on the floors, a floor drain should be located at some point and the floor made to pitch from all points towards this drain. By providing an outlet of this kind the floor can be washed by turning a hose on it at any time, while the daily use of the laundry will insure the trap being sealed at all times with water. In private houses an ordinary trap with a cleanout ferrule can be installed flush with the floor, and when the floor is to be cleaned the cleanout can be removed, to be replaced again when the scrubbing and cleaning is over. When an arrangement of this kind is installed, it should be located in an out-of-the-way place, so no one will trip over the brass plug which would extend above the floor level.

(To be continued.)

NEWS FROM OHIO.

Columbus, O.—Contractors engaged in installing heating and ventilating systems have been notified that the board of education at Washington C. H., O., contemplates the erection of a fire-proof school building in which will be installed a mechanical furnace with automatic regulation. The plans for the structure are now being prepared by Architects Howard and Marriam of Columbus, and bids on the general contract and also the heating, ventilating and plumbing will be asked for soon.

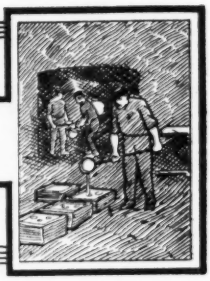
Portsmouth, O.—The West Plumbing Co. has been awarded the contract for installing the plumbing and gasfitting in the Y. M. C. A. building being erected at Russell, Ky.

Columbus, O.—The plumbing contractors are up in arms over the frequent thefts of plumbing from partially completed houses and steps are being taken to capture some of the thieves. It appears as if there was an organized gang of thieves, as many houses have been stripped of their plumbing over night, and it would be necessary to have a horse and wagon to haul the materials from the scene of the robbery. Frank Carrier, a police character of Columbus, was recently arrested on the charge of stealing the plumbing from a building at Front and State streets and will be dealt with severely. He was only released from the workhouse February 3d after serving a sentence on a similar charge. Others will be apprehended if possible.

The Real Thing.

They strolled down the old lane. "And do you really love me, George?" she asked for the tenth time. "Love you!" he echoed, heroically, "I love you and always shall love you, my pet." "You really mean that?" "Yes. I shall love you until the sky falls." "O George!" "Yes, until the sun falls." "Gracious, George!" "Even until the price of beefsteak falls." Bidding him to say no more, she placed her slender hand within his own and they strolled away to the nearest parsonage.—Ex.

THE METAL MARKET



SOUTHERN IRON MARKET STRONGER.

Furnace interests in the South have advanced their quotation for No. 2 Southern foundry Birmingham to $11.25 for the third quarter and $11.50 where deliveries are to run over the second half. A large manufacturer in Milwaukee purchased 10,000 tons of malleable for second half delivery. Bessemer iron and other steel-making iron have also been more active. In the New York market there have been several lots of 1,000 tons each sold during the last week. Some of the cast-iron pipe manufacturers have been testing the market, and it is probable that their orders will be placed in the near future. In Chicago more activity is noted, and, while no important deals have been announced as closed, there have been several large inquiries. The railway rate decision, while at first a distinct disappointment to the manufacturers of railroad equipment, is recognized by unbiased men as being in the interest of the general welfare of the country. It will be an effective barrier against any further increases in wages this year. Prices of iron are somewhat stronger than a week ago and are quoted as follows:

No. 2 Southern foundry, Birmingham	$11.25 to $11.50
No. 1 Northern foundry, New York	15.00 to 15.75
No. 2X Northern foundry, New York	15.25 to 15.50
No. 2 plain, Northern foundry, New York	14.75 to 15.00
No. 2 Northern foundry, Chicago	15.50 to 16.00

OLD IRON.

The market is strong and business is fairly active. The Isthmian Canal Commission is selling 4,000,000 pounds of miscellaneous scrap in Philadelphia. Heavy-melting steel scrap is in especially good demand. Prices are as follows:

No. 1 yard wrought, long	$13.00 to $13.50
No. 1 yard wrought, short	12.00 to 12.50
Heavy-melting steel scrap	11.50 to 12.00
Machinery cast	12.50 to 13.00
Wrought pipes and tubes	10.50 to 11.00
Malleable castings	12.50 to 13.00
Wrought turnings	6.50 to 7.00
Cast borings	6.50 to 7.00
Stove plate	10.00 to 10.50
Light iron	5.50 to 6.00

COPPER MARKET EASIER.

Some shading has been done in the price of copper, but this has been only slight, and the general asking price is unchanged at 12.75 cents. Electrolytic has been freely purchased by all classes of manufacturers on a basis of 12.37½ cents, New York. Small consumers are acknowledged to be the leading purchasers of copper, and in the aggregate their takings have been large.

TIN STILL AT A PREMIUM.

Although prices of tin have again receded, it is now possible to buy tin at 42.25 cents in five ton lots New York. This is still a premium over the London quotation. Many rumors have been rife during the last week that the syndicate in London was having internal troubles and some of the selling was tin for the account of dissatisfied members of the syndicate. Statistics recently compiled show that the total visible supply throughout the world was, on Feb. 28, 4,000 tons less than a year ago. At the same time prices are practically 10 cents a pound higher, which fully discounts this shrinkage in the visible supply.

LEAD.

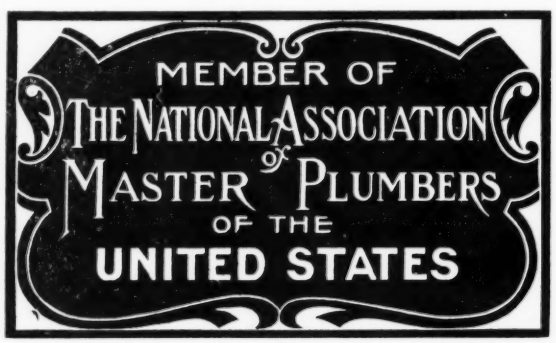
The market has weakened further and outside sellers are taking practically all the business at 4.40 cents New York. The American Smelting & Refining Co., continue to quote shipment lead in 50 ton lots at 4.40 cents New York. In St. Louis the market is dull and weak with lead pressing on the market at 4.25 cents.

SPELTER.

The market is slightly stronger in the West and this has been reflected in an advance of 10 cents in the New York market. In St. Louis, prime Western is quoted at 5.50 cents, and in New York at 5.70 cents.

PHILADELPHIA MASTER PLUMBERS' "SHOP SIGN."

At the regular February meeting of the Master Plumbers' Association of Philadelphia, neat metal "shop signs," of which the accompanying is a photo-reproduction, were



Philadelphia Master Plumbers' "Shop Sign."

given to members. The signs are about 3x4 in. in size, the wording being in black enamel. These signs can now be seen in conspicuous places in the offices of these master plumbers, and it is expected that they will in some measure add to the dignity of the craft.

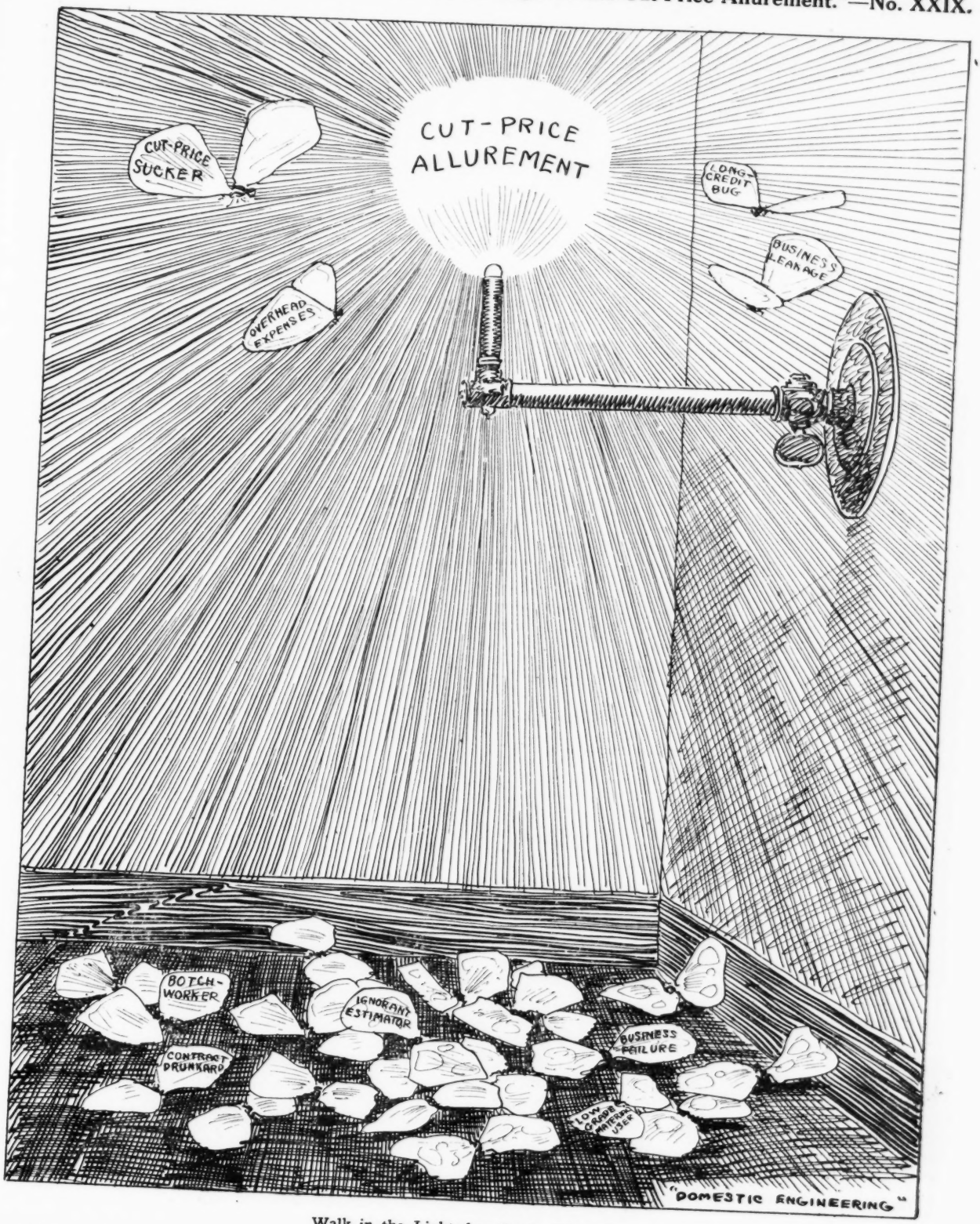
Rensselaer, N. Y.—Dr. J. C. Sharkey has been reappointed health officer and city physician of Rensselaer, N. Y., by the board of aldermen.

Altoona, Pa.—O. L. McCartney will build a new plumbing shop, which will be a two-story building and cost in the neighborhood of $3,500. The building will occupy a site 20 by 75 feet, and will be the largest plumbing establishment in this city.

Salem, O.—John R. Stratton and Edward F. Stratton will form a partnership and open a general plumbing business. They are now completing a big contract on the re-built Friends' boarding school at Barnesville, O.

Colorado Springs, Colo.—E. R. Joyce, who has been for a number of years in the heating and plumbing business here, has retired from business and is succeeded by the D. L. Flatt Plumbing & Heating Co. Mr. Joyce has been very active in associational matters, always in the lead for the betterment of the trade, and the Colorado Springs Master Plumbers' Association has elected him an honorary member in appreciation of his worth. Mr. Joyce celebrated his retirement by giving a banquet to the master plumbers and their ladies at the Antlers' Hotel on February 8th, at which 24 were present to enjoy the evening.

"Domestic Engineering" Cartoon on "The Danger of the Cut-Price Allurement."—No. XXIX.



Walk in the Light, but Dodge That Flame.

If you want to possess a special proof of this or any other of our cartoons, let us have your request at once. We have many applications for our cartoons for framing and want to take good care of all demands made.

AMONG THE WHOLESALERS

OPENS CHICAGO OFFICE.

The Hill-Canton Dryer Co., Canton, O., has opened a western office at 1102 Monadnock Bldg., Chicago. Fred Liebrich is manager of the new office.

WILL DEAL IN SANITARY SPECIALTIES.

The Larabee & Hopkins Supply Co., Cleveland, O., has been incorporated with a capital of $25,000 to deal in sanitary supplies. The incorporators are H. H. Hopkins, A. F. Larabee, A. G. Larabee, H. A. Silbernail and L. S. Parker

WILL DEAL IN PLUMBING SPECIALTIES.

The Heinfeld Manufacturing Co., New Bremen, O., has been incorporated with a capital of $10,000 to deal in plumbers' specialties. The incorporators are: Herman Heinfeld, Louis Heinfeld, Edward Heinfeld, Matilda Heinfeld and Sophia Heinfeld.

WILL MAKE GAS WATER-HEATERS.

The Bryant Heater & Manufacturing Co., Cleveland, O., has been incorporated with an authorized capital of $50,000 to manufacture gas water-heaters, gas regulators, and gas and steam appliances and specialties. The incorporators are: Charles L. Bryant, Otto Fox, Bernard A. Hendrickson, Guy M. Lee and Albert C. Orth.

ANNUAL MEETING OF THE HAYDENVILLE CO.

The Haydenville Co., Haydenville, Mass., manufacturers of plumbers' brass goods, held its annual meeting in Jersey City, N. J., recently and declared a dividend of 5 per cent. payable in cash on March 30. The following board of directors was elected: President, C. J. Hills; vice-president and treasurer, A. S. Hills; secretary, R. B. Hills; directors, Hon. Richard W. Irwin, Northampton, Mass.; and James P. Northup, Jersey City, N. J.

CONTROLLING INTEREST IN NOVELTY IRON CO. CHANGES HANDS.

The controlling interest in the Novelty Iron Co., Canton, O., was purchased Saturday, March 4th, by George E. Downe and eastern capitalists, and a reorganization effected. After the deal was consummated the following officers were elected: President, Huntlie Gordon, Boston; vice-president and general sales-manager, George E. Downe, Canton, O.; secretary and treasurer, H. H. Bryan, Johnstown, Pa. Board of directors: Huntlie Gordon, George E. Downe, H. H. Bryan, J. J. Grant, Sol. Toranski, D. R. McCallum and W. E. Sherlock. George E. Downe is well-known to the heating trade by reason of his connection with the American Radiator Co., of Chicago, and the J. H. McLain Co., of Canton, O.

H. E. Sherlock, former manager of the company, contemplates a prolonged sojourn in southern California, and will not be actively connected with the new organization. The Novelty Iron Co. is one of Canton's most successful manufacturing companies. It was originally known as the Knoble & Sherlock Co. It was incorporated in 1895 with a capital stock of $150,000, as the Novelty Iron Co. The plant and offices of the company are located at 1115 East Eighth St. The principal product of the company is hot-water heaters.

The consideration has not been made public nor was it announced whether the capital stock has been increased or whether an increase of stock is contemplated. The company has been in a flourishing condition, and it is stated the change of stock will not bring about any changes in the operation of the plant.

WILL BUILD NEW PLANT.

The Wise Furnace Co., Akron, O., is having plans prepared for new foundry, machine shop and warehouse to be erected in Akron. Work will be started as soon as weather will permit.

PERSONAL MENTION.

Geo. P. Stannard, sales-manager of the Burlington Brass Works, Burlington, Wis., has just left on a two-months trip to the Pacific Coast.

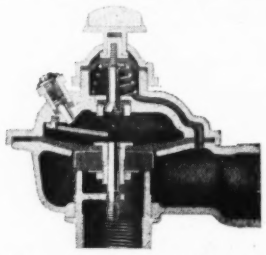
Henry O'Meara, formerly conducting a plumbing and heating business at Earlsville, Ill., has accepted a position as traveling salesman with Weil Bros., of Chicago, covering Central Iowa.

Fred Myers of the Allen-Myers Plumbing Co., Rock Island, Ill., spent several days last week in Canton, O., as guest of Novelty Iron Co. On several occasions during his visit he was seen manipulating a long stick over green cloth in successful efforts to hold the Illinois state championship against that of Ohio, Ohio being represented by L. R. Garvin, C. A. Yinkey and U. I. Bott, salesmen of the Novelty Iron Co. H. E. Sherlock remained neutral and officiated as referee.

Thomas Tait, member of the American Society of Heating and Ventilating Engineers and of the American Society of Inspectors of Plumbing and Sanitary Engineers, is now connected with the Moline Vacuum Vapor Heating Co., Moline, Ill., as consulting engineer and chief draftsman. The company is to be congratulated on having secured this valuable addition to its force.

THE HAAS HYDROMETER FLUSH-VALVE.

The Haas hydrometer is a device of great merit, as many severe tests have proven. The main body of this flush-valve has a large unobstructed direct waterway and insures a frictionless flush, which is one of the most important features of any closet; the main valve is very simple, consisting of a rubber diaphragm made of the very best material, to which is attached the flat disk.



The Haas Hydrometer Flush-Valve.

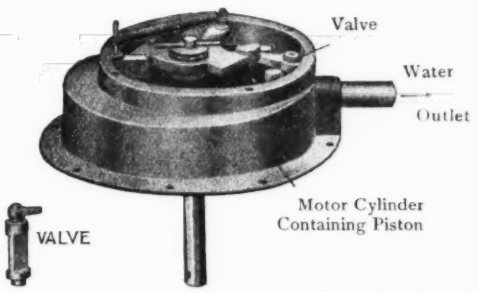
The flush is operated by an opening in the center of the diaphragm through which passes a stem or guide for the valve and allows a limited amount of water to pass from rear of diaphragm to the front chamber. The front cham-

ber is closed by a self-closing disk and and when the push-button is pressed, the disk is opened, allowing the accumulated water to escape through a channel into the flush pipe and relieving the pressure in the front chamber; the pressure being now in the rear of the diaphragm it forces the diaphragm forward and allows the water to pass from supply to flush.

The area of the surface in the front chamber being larger than the supply inlet, it slowly diminishes the flush and closes the supply opening as the water forces its way through center opening in the diaphragm, thus insuring a positive shut-off. All the working parts are made interchangeable and the valve can be regulated and operated to discharge any quantity of water, by the regulating device which is placed in the front chamber, extended through the face of the valve and adjusted by means of a screw driver without shutting off the water, thus making an entirely different device from any used on other valves and overcoming the difficulty of different water pressures. Circulars containing complete information can be obtained from the Hydrometer & Specialty Co., Kokomo, Ind., or by writing to the Philip Haas Co., Dayton, O. Kindly mention "D. E." when you do it.

THERE'S MONEY IN SUPPLYING LADIES WITH FRIENDS.

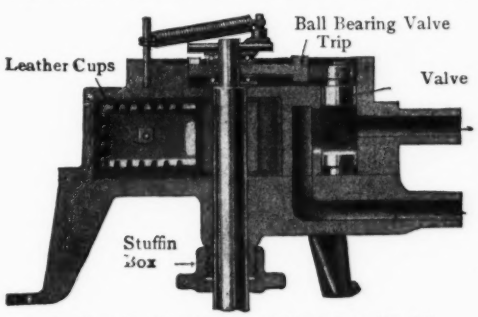
This discovery has been made by D. L. Bates & Bro. Co., Dayton, O., but there are so many ladies needing friendship that they are inviting plumbers to participate



Interior Construction of "The Ladies' Friend Gearless No. 1."

in the profits attending the relief of suffering femininity. The Bates' friend has four legs to perfect its understanding and is known as "The Ladies' Friend Gearless No. 1." In brief, it is a washing machine, operated by water-power. The operation of the gearless motor is ingenious and efficient.

The water enters the lower spout, passes upward and enters a ⅝-in. hole, in which is fitted loosely a straight two-way valve, that regulates the direction of the flow of



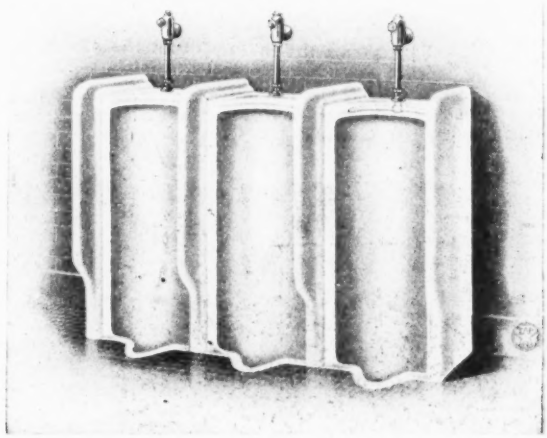
Another Sectional View of "Gearless No. 1."

water as it enters the cylinder. On the center shaft is attached a wing or piston head, packed with leather, similar to the ordinary pitcher pump. As the water enters the cylinder at the right, the hydraulic pressure in the rear of this wing pushes it ahead, describing an arc or half circle, while the water ahead of this wing exhausts through the opposite side of the valve and out through the upper spout. Before the piston reaches the end of the stroke the pin at the top of the shaft engages the ball-bearing valve trip to which is attached a coiled bronze spring. The instant this spring passes over the center of shaft, the trip reverses the valve, shutting off the entrance of the water at the right, and opening the valve at the left side, thus reversing the operation. The valve is merely dropped into the opening and can be removed with the fingers or a pair of pliers. The top cap, in which the mechanism works, is packed with heavy grease, so all working parts work right in oil.

Many plumbers are doing good business with washing machines. A hundred times more plumbers are content to let the hardware men do all the business in these lines. Every apparatus that takes away a human ill is a profitable business-opportunity. You can obtain illustrated descriptions and quotations from D. L. Bates & Bro. Co. upon request.

THE HINSDALE SOLID PORCELAIN URINAL STALL.

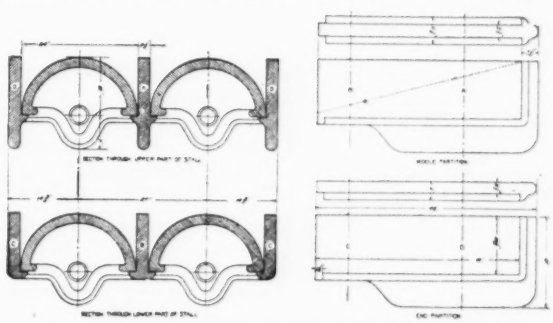
The Trenton Potteries Co., Trenton, N. J., announces that it has secured the right to manufacture and sell the



Three-Part Set of Hinsdale Solid Porcelain Urinal Stall.

patented Hinsdale solid porcelain urinal stall. This will be of particular interest to the plumbing trade, for it makes this particular style of urinal easily obtainable.

A great many plumbers still adhere to the old-style small china urinal. Of course it is sometimes desirable



Structural Details of the Hinsdale Solid Porcelain Urinal.

and necessary to install these, for instance, when the toilet-room is above the ground floor and adequate foundations for the greater weight of the urinal stall are lacking. The question of cost sometimes enters into the installation, but as a rule the builder is ready to use the more expensive type if you can convince him of its superiority.

Porcelain urinal stalls have so many points in their favor, too. There is no danger of spatter nor place for

dirt to collect. China does not retain any smells and its surface is easily cleaned. The spreader, which is concealed under the upper ledge of crockery, thoroughly washes the surface upon every flush.

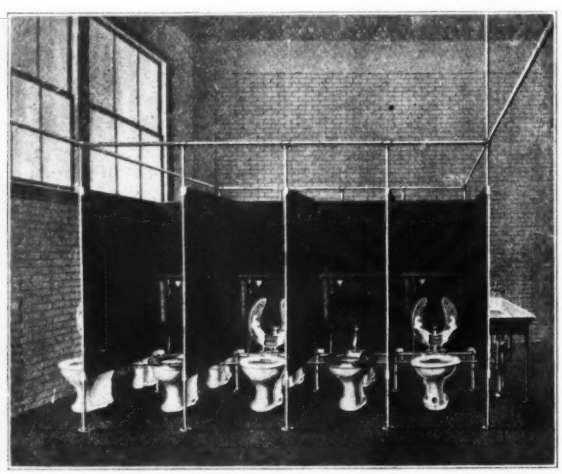
The Hindsdale patent urinal stall which the Trenton Potteries is marketing under the Plate No. 515, embraces features which stamp it as a most desirable type. A two-part set consists of only five pieces, against 14 separate parts of some other styles of porcelain urinal stalls. This means that the Hinsdale is more easily set up and less liable to breakage in installing, as five parts are each naturally heavier than 14.

The most sanitary feature, and therefore appealing most to the builder and architect, is the fact that there are no joints to catch dirt or discolor. The floor is integral with stall and the side slabs fit between the stalls and only reach to the floor line.

The accompanying illustration of a three-part set of Plate No. 515 and the line cut showing the structural details, will give the reader an excellent idea of what has been obtained in this new stall. The Trenton Potteries Co. has prepared loose-leaf illustrations of Plate No. 515, which will be sent promptly to interested parties upon application mentioning "Domestic Engineering."

THE "IDEAL" PLUMBING LINES.

The "Ideal" plumbing lines are described in Catalog "L", issued by the Ideal Manufacturing Co., Detroit, Mich. When you enter a man's house, you form some idea of



An "Ideal" Factory Toilet-Room.

the owner by the condition of the reception-hall. A favorable impression is given of Catalog "L" by the "Architects' Quick Index" in the opening pages, which quickly points the searcher to plumbing specialties for public buildings, residence-work, factories, schools and fire-proof buildings. Nearly 150 pages are contained in this work and every page is attractive. The illustration of a toilet-room in the Packard Motor Car Co's. factories at Detroit, is especially fine. It is equipped with "Ideal" combinations. Of singular interest and attractive appearance are the soil-pipe stack-base cleanout-fittings, the sanitary tees and crosses, the double bath-room fittings and the combination sanitary tees and long quarter-bends. It is the kind of catalog that makes for better work, better goods and better prices. The company has a large plant at Detroit and one at Windsor, Ontario, so that it is advantageously located to take care economically of United States and Canadian business. We forgot to mention a special cast-brass ferrule in the above list of special things to look at. All these you can see by securing the catalog which will be mailed to you upon request. Put D. E. on top of letter-head. They will then know the source of your information.

"EVERY LITTLE MOVEMENT HAS A MEANING OF ITS OWN."

And Maybe You are Losing Money by It.

We believe that a man who is used to thinking steadily can make $100 by paying $2.00 for a copy of "Motion Study," and then applying its message to his work. It is written by Frank B. Gilreth and published by the D. Van Nostrand Co., New York City. We do not advise any one to buy it who has the idea that the $100 will come to him on the get-rich-quick order. "Motion Study" offers a method for increasing the efficiency of the workman, and therefore of the master also. Wide-awake readers will find a suggestion for labor-economy on nearly every page, a suggestion applicable in some way to their daily work. We cannot describe the work fairly by a mere partial review. You will have to take our commendation on trust. We will be glad to hear from our readers as to their gain by application of some of its motion-saving principles. We cannot refrain from quoting one example to give you an idea of its method of treatment, dealing with the bricklaying trade.

"In opening a paper bag of cement the average untrained laborer usually cuts the bag in two and removes the paper in several pieces and with many motions. The correct way is to cut the bottom with a shovel and pull the bag upward in one piece by grasping the bag just above the string." The book may be procured from the D. Van Nostrand Co. or from the Book Department "Domestic Engineering."

"OPEN-AIR CRUSADERS."

"Open-Air Crusaders" is the title of a most interesting book published by the United Charities of Chicago, 51 La Salle St., Chicago. Most capably edited by Sherman C. Kingsley, the society's general superintendent, it is a report of the Elizabeth McCormick open-air school, together with a general account of open-air school-work in Chicago and a chapter on school-ventilation. Its keynote is "Ventilating systems which do not ventilate have been reverenced too long." It is a cheerful voyage of discovery into the merits of fresh air. We are trying to learn how to live without breathing. We have forgotten that we have such organs as lungs. "Open-Air Crusaders" restores our faith in the wisdom and goodness of Providence in supplying the universe with an atmosphere. Through the generosity of the Trustees of the Elizabeth McCormick Memorial Fund the United Charities of Chicago is enabled to supply you with a copy of this book free of charge. The book is splendidly illustrated and those who want to realize fully the treasure of open-air should write for a copy. You can help your boys and girls by letting them read this book.

THE HONEYWELL $500 PRIZE COMPETITION.

The Honeywell Heating Specialty Co., Wabash, Ind., is highly gratified at the result of its recent competition. The offering of $500 for the five best letters detailing the experiences of plumbers and fitters in the use of the Honeywell system of hot-water heating aroused considerable attention and approving comment on the enterprise of the company.

The competition brought hundreds of aspirants to prize positions into the field. The results and letters are published in the company's advertising pages in this issue. The judges of the merits of the competing letters were: J. H. Fenton, Cedar Rapids, Ia.; John T. Sadler, Elmira, N. Y., and A. W. Gardner, Montreal, Canada. The first prize of $200 was awarded to one of our Canadian cousins, Wm. Whiteford, Whiteford Bros., Regina, Saskatchewan. The second prize of $125 was apportioned to F. F. Hitchcock, Woodbury, Conn. The third best letter, with a prize-value of $100, was that of Jos. Young, Albertson & Young Co., Atlantic City, N. J. H. H. Weilage, superintendent of F. A. Clegg & Co., Louisville, Ky., captured fourth-place honors and $50. The fifth prize of $25 went to S. F. Parzybok, Iowa Hardware Co., Vinton, Ia. The letters are extremely interesting and the Honeywell Heating Specialty Co. is to be congratulated on its success. The company will publish in booklet form a large number of the letters received.

March 15, 1911.—The third annual convention of the Southwestern Master Plumbers' Association, at Connellsville, Pa. The convention will be held in the Chamber of Commerce rooms, First National Bank Building. The officers of the association are: President, H. Burd, Uniontown, Pa.; secretary, C. L. Titus, 36 Morgantown St., Uniontown, Pa.; treasurer, F. T. Evans, Connellsville, Pa.

March 21 and 22, 1911.—The annual convention of the Indiana State Association of Master Plumbers, at Vincennes, Ind., with headquarters at the Grand Hotel. The Board of Directors will hold a meeting, also at Vincennes, on March 20th, the day before the convention. The officers of the association are: President, C. H. Maloney, Gary; vice-president, Joseph Hayes, Indianapolis; secretary, John B. Burke, Gary; treasurer, A. E. Werkhoff, Lafayette. Directors: John O'Rourke, Ft. Wayne; A. C. Bennett, Kokomo; A. J. Weinhardt, Terre Haute; Edward Kanney, La Porte; W. H. Meerhoff, Richmond; Adolph Lindeman, H. G. Newman, Evansville.

March 23, 24 and 25, 1911.—The 14th annual convention of the Montana Master Plumbers' Association, at Gregson Springs, Mont. The officers of the association are: President, Walter Forbes, Butte; secretary-treasurer, D. H. Budd, Bozeman.

April 5 and 6, 1911.—The 19th annual meeting of the Michigan Association of Master Plumbers, at Muskegon, Mich., with headquarters at the Occidental Hotel. The officers of the association are: President, W. J. Dowsett, Jackson; vice-president, Thomas J. Shields, Lansing; secretary and treasurer, W. A. Decker, Grand Rapids, Mich.

April 11 and 12, 1911.—The annual convention of the State Association of Master Plumbers of Kentucky, at Frankfort, Ky. The officers of the association are: President, Jacob Isaacs, Louisville, Ky.; vice-president, J. J. Fitzgerald, Lexington, Ky.; secretary-treasurer, Geo. F. Roser, 308 S. Third St., Louisville, Ky. Board of Directors: H. L. Nevins, Louisville, Ky.; Ed. Hannon, Paducah, Ky.; J. H. Adams, Harrodsburg, Ky.

April 18, 1911.—The annual convention of the Pennsylvania State Association of Master Plumbers, at Altoona, Pa. The officers of the association are: President, S. S. White, Pittsburgh; first vice-president, C. K. Will, Lancaster, Pa.; second vice-president, Robert Purse, Johnstown, Pa.; third vice-president, D. F. Durkin, Jr., Philadelphia; treasurer, John H. Birchall, Allentown, Pa.; secretary, R. E. Carson, 1827 Perrysville Ave., Pittsburgh.

April 20, 1911.—The annual meeting of the Northwestern Association of Master Plumbers, at Saegerstown, Pa. This association is composed of master plumbers in Eastern Ohio, Western New York and Western Pennsylvania and its officers are: President, L. R. Stone, Greenville, Pa., and secretary, M. C. Judd, Meadville, Pa.

May 16, 1911.—Annual meeting of the West Virginia State Association of Master Plumbers, at Morgantown, W. Va. The officers of the association are: President, E. C. Wiedebusch, Morgantown; secretary, L. W. Joseph, Morgantown.

June 5, 6, 7 and 8, 1911.—The 23rd annual convention of the National Association of Master Steam and Hot-water Fitters, in Chicago. The officers of the association are: President, Charles A. Geoghegan, New York City; vice-president, Edward B. Denny, Newark, N. J.; treasurer, Juan A. Almirall, New York City; secretary, Henry B. Gombers, 260 West Broadway, New York City.

June 6, 7 and 8, 1911.—Third annual meeting of the National District Heating Association, at Pittsburgh, Pa., headquarters Fort Pitt Hotel. The officers of the association are: President Geo. W. Wright, Baltimore, Md.; first vice-president, A. D. Spencer, Detroit, Mich.; second vice-president, W. J. Grams, Seattle, Wash.; third vice-president, Warren Partridge, Springfield, Ill.; secretary-treasurer, D. L. Gaskill, Greenville, O.

June 13, 14 and 15, 1911.—The 29th annual convention of the National Association of Masters Plumbers of the United States, at Galveston, Tex., with headquarters at the Piedmont Hotel. The officers of the association are: President, A. Selden Walker, East Orange, N. J.; vice-president, Alfred C. Eynon, Canton, O.; secretary, Samuel F. Wilson, East Orange, N. J.; treasurer, Wm. McCoach, Philadelphia, Pa.

PREPARING FOR THE CHICAGO MEETING OF THE N. A. M. S. & H. W. F.

Henry B. Gombers, secretary of the National Association of Master Steam & Hot-Water Fitters, 260 W. Broadway, New York City, is planning a vigorous campaign to make the 23d annual convention of this association a grand success. This convention will be held in Chicago, June 5, 6, 7 and 8, 1911, as previously mentioned

Certificate of Membership.

in these columns. An innovation which Mr. Gombers originated some time ago is proving a valuable asset in the conduct of the association's affairs, inasmuch as it helps to keep the membership in touch with the headquarters of the organization. We refer to the handsome certificate of membership shown herewith, which is now sent to members in good standing and renewed annually.

BUSINESS VENTURES.

Cherryvale, Kans.—McCue & Avey is the style of a new firm which has just been formed here to engage in the plumbing and heating business.

Beloit, Wis.—Herbert Palmerton, formerly in the employ of Paul Wolter, has opened a plumbing and heating establishment at 316 East Grand Ave., in this city.

Freewater, Ore.—Allan & Calder, who have been in the plumbing business in Milton, Ore., for a number of years, have a branch establishment here.

Louisville, Ky.—J. F. Leanhart & Sons have incorporated with a capital of $50,000 to conduct a plumbing business. The incorporators are J. F. Leanhart, F. G. Leanhart and others.

Minneapolis, Minn.—Haskco Heating & Plumbing Co. has been incorporated with a capital of $50,000. The incorporators are W. Yale Smiley, John J. Leahy and Joseph R. Bolduc.

Beach, N. D.—The Petersen Brothers Plumbing & Heating Co. is the style of a new firm which has just started in business on Second avenue in this town. The members of the firm are H. M. Petersen and L. T. Petersen.

Mason City, Ia.—Dan Barron and Leroy Lightbody, both well known plumbers, have formed a partnership and will engage in the plumbing, heating and gas-fitting business at 110 W. Fifth St.

PACIFIC COAST LETTER

The Master Plumbers' Association of San Francisco has just effected an agreement with the General Contractors' Association of this city that is expected effectually to settle to the satisfaction of all concerned the long vexing question of sub-contracting. Thirteen months ago the Master Plumbers' Association adopted a rule to the effect that none of its members would accept plumbing work from a general contractor as a sub-contract, it being claimed that much loss had resulted to plumbers in the past on account of this method of doing business and many serious evils had arisen. While the new rule did not prove entirely effective in stopping sub-contracting, it had the effect of causing owners, more than ever before, to deal directly with the plumbers and also caused the general contractors to come to an understanding that certain of the evils that had existed in the past would have to be abolished. For some months past the general contractors and the plumbers have been working together on some plan which would permit of the acceptance of contracts from general contractors and end the losses and friction that had been experienced in the past. This work has resulted in an agreement that has been accepted by both parties. The new agreement provides that master plumbers shall be at full liberty to bid for work from members of the General Contractors' Association or any one else, and in turn general contractors may solicit bids from members of the Master Plumbers' Association or plumbers not affiliated with that body.

It provides for a recording system which shall show the order in which all bids are received and further states that there shall be no limit set on the number of bids that may be solicited. To prevent certain sharp practices that have been quite common under the old system, it is specified that master plumbers will be allowed to submit but one bid on each contract to be let, thus putting an end to the pitting of one plumber's estimates against another after the bids are in. In order to insure against financial loss, it is stipulated that master plumbers shall be required to secure from those for whom they do work a surety bond equal in value to the value of the contract, and it is further stipulated that a system of progressive payments be agreed upon with the acceptance of every contract. This is to be based upon the system of payments demanded by the general contractor from the owner or a new schedule is to be selected agreeable to both parties, final payments to be made within 15 days from the completion of the work in order to give plumbers the benefits of the lien law, something that has not been enjoyed by them to a great extent in the past. In case of disputes a committee composed of three members of each organization will pass upon the matter in question and the decision reached by them will be final. This agreement is looked upon as being one of the most important achievements of the Master Plumbers' Association of San Francisco in years, and it is believed that the result will be the settlement of a most important question. The general contractors and plumbers are now working in harmony and the new plan will shortly be placed in operation. Practically no objections have been voiced to it except from a few who have made a profit from plumbers in the past by the sharp practices that are now guarded against.

Several important auction sales of plumbing supplies and shop equipment have taken place in this city during the past couple of weeks, including the Cummins stock and the stock formerly owned by the Dolan Co. This latter company has been very active here since the tearing down of temporary buildings commenced and purchased immense quantities of second-hand goods. It also handled a line of second grade and damaged plumbing supplies and did quite a business in this line. The entire stock is being disposed of this week at auction.

Plumbers around the Bay are much interested in the agitation that is being made at the present time for the formation of a Greater San Francisco by the consolidation of Oakland, San Francisco, Berkeley, Alameda and a number of small places along the Bay shore. It is conceded that the interests of these places are identical and from the experience of New York and Brooklyn it is argued that great advantages would be the immediate result of such a union. Bills are now pending in the state legislature which will make possible this federation and it is hoped that a consolidation can be effected by the time the World's Fair is held here, but this is scarcely thought possible. Many in Oakland are in favor of this move in the line of progress, but, of course, the professional politicians there are working hard against it. The sentiment in Berkeley and Alameda is strongly in favor of a move of this kind, which would at the same time allow the identity of these places to be preserved. It is believed that the prestige which always goes with large cities would be such that many advantages would be derived from consolidation in addition to the benefits arising from lower tax rates as a result of the elimination of many officers. The plumbing trade of the smaller districts would, under the proposed arrangement, come into closer contact with the plumbing trade of San Francisco proper and the associations across the Bay which are now struggling along could become a part of the local body, whose efficient work has long been a matter of comment. At the present time, each of the large cities around the Bay has different and widely varying building and plumbing laws, making it a difficult matter for plumbers in one city to do work in another, although conditions are identical, and these could be made more uniform by consolidation. In some of the smaller places sanitary regulations are very lax and in some of the newly acquired territory of Oakland sewer systems are entirely lacking.

At the time that Oakland annexed a large outlying territory in 1909, promises were made that these districts would at once be given attention and sewer systems installed, but there has been nothing done as yet in this direction and plumbers who expected to be able to secure large amounts of work have been greatly disappointed. At the time of annexation several sanitary districts had been formed and bonds had been voted for sewers, but when this territory became a part of Oakland the issues were declared to be worthless. Measures have been introduced in the state legislature to remedy the trouble and it is now believed that the funds that were raised can be handled by the city of Oakland for the purpose originally outlined. The entire eastern section of Oakland is in a deplorable shape, but it is hoped that the passage of the new law will enable the work planned a couple of years ago to be carried out in the near future. The districts involved have a large population and there will be much work for plumbers when sewers are laid.

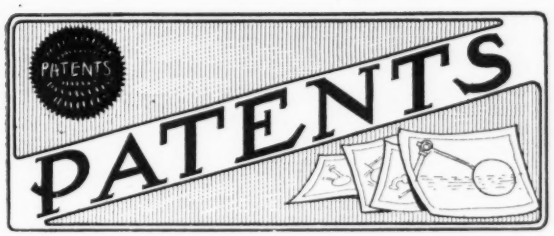
Hillsborough, Cal.—A permit has been taken out for the installation of a heating and ventilating system in the residence of E. J. De Sabla, the work to cost approximately $2,000.

Merced, Cal.—Bids are being received for the construction of a septic tank on the city's sewer farm.

Porterville, Cal.—Smith Bros. will shortly open a new plumbing shop at that place.

THE 23D ANNUAL CONVENTION OF THE NEW YORK STATE ASSOCIATION OF MASTER PLUMBERS.

The 23d annual convention of the New York State Association of Master Plumbers was held at the Powers Hotel, Rochester, N. Y., on Tuesday and Wednesday, March 7th and 8th. The meeting was well attended and most successful in every respect. On Wednesday afternoon the convention elected the following officers for the ensuing year: President, John H. Moran, Albany; vice-president, Frank B. Lasette, New York City; recording and financial secretary, James H. Doody, Albany; treasurer, Chas. A. Campbell, Watertown; national state vice-president, B. Joseph O'Donnell, Syracuse; delegates-at-large, Louis J. Yauchzi, Rochester; Thomas E. O'Brien, Brooklyn; John R. Sheehan, Schenectady; George L. Brucker, Utica, and Frank L. Beyer, Buffalo.



980,901.—Branch Pipe Connection. Robert Ballantyne, Glasgow, Scotland, assignor to Stewarts & Lloyds, Limited, Coatbridge, Scotland.

980,914.—Device for Removing Excrescences from Pipes. Melvin Berlin, Columbus, O.

981,031.—Continuous Filter. Arthur Philip Stitzel, Louisville, Ky.

981,083.—Oil-Burner. Henry J. Hennings, San Gabriel, Cal.

981,149.—Humidifier or Spray-Producer. Thomas Winstanley, Blackburn, England, assignor to British Humidifier Company, Limited, Blackburn, England.

981,172.—Sand-Trap for Pumps. Rudolph Conrader, Erie, Pa.

981,244.—Electric Water-Heater. Herbert A. Burns, Oakland, Cal., assignor to Diamond Electric Water Heater Co., San Francisco, Cal.

981,254.—Refuse-Burner. John R. Fortune and Harold S. Wells, Detroit, Mich., assignors to Murphy Iron Works, Detroit, Mich., a corporation of Michigan.

981,275.—Downdraft-Furnace. William H. James, Cincinnati, O.

981,301.—Water-Lift. John E. Osmer, Chicago, Ill.

981,317.—Water-Heater. John Schlosser, Wilmington, Del.

981,382.—Expansion Bolt. Charles J. Clements, New York, N. Y.

981,396.—Soldering Implement. Frank W. Downing, Essex, Conn.

981,448.—Sink-Strainer. Harry Matthews, Cleveland, Ohio.

981,567.—Die-Stock Oiler. Martin E. Johnson, Chicago, Ill.

981,660.—Water-Meter. Justus Royal Kinney, Boston, Mass.

981,842. Faucet. Henry G. Cordley, Glen Ridge, N. J.

982,163. Radiator. Rudolf Thiel, Lübeck, Germany.

982,229. Thermostatic Controller for Fluid-Heating Systems. Charles E. Adair, Buffalo, N. Y., assignor to Cyphers Incubator Co., Buffalo, N. Y., a corporation of New York. In a thermostatic controller for fluid heating systems, the combination of a casing through which the heating fluid flows having an inlet and an outlet, a thermostatic element therein, a valve for closing the inlet, a lever within the casing connecting the valve and the thermostatic element, a frame within the casing provided with a fulcrum on which the lever is pivoted, and means connected with the frame and passing through a fluid-tight opening in the casing, so as to be accessible from without the casing, to shift the fulcrum of the lever and adjust the valve.

982,400. Automatic Valve. Thomas H. Walker, Kansas City, Mo.

982,434. Filtering-Faucet. Frank Koss, Detroit, Mich., assignor of one-half to Gottfried Prima, Detroit, Mich. In a filtering faucet, the combination of a hollow body having one end turned down and having an interior wall separating it into two chambers, a stem projecting from the upper side of the body, bearings for the stem mounted in the body, a crank at the lower end of the stem, a valve mounted at the inlet end of the body, a rod connecting said valve and crank, and a filtering device wherethrough a liquid may pass from one chamber of the faucet to the other.

982,553. Child's Closet-Seat. Nathaniel P. Wallace, Ypsilanti, Mich. The combination of an ordinary closet bowl and seat, sustaining means as a floor, slotted curved standards fixed to such sustaining means and adjacent to said bowl, a child's seat, means pivoting the same to said standards, said pivotal means having a sliding engagement with the slots thereof whereby the said seat may be drawn

That Was an Adverse Decision,—

That the Interstate Commerce Commission brought in against the Railroads

WHY? Because they were not operating on the basis of "Scientific Management"

Will it be an adverse decision that the Court of the Consumer will bring in against ***you,*** MR. DEALER, on the same count? Are ***you*** employing up-to-date methods in ***your*** business; are ***you*** stopping up all the leaks in ***your*** shop; most of all, are ***you*** depending for ***your*** heating requirements upon

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thus saving in the cost of installation, ridding ***yourself*** of the expense of "come-backs", and making for ***yourself*** a host of satisfied owners?

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upward and dropped or folded down horizontally upon the seat of the bowl, substantially as described.

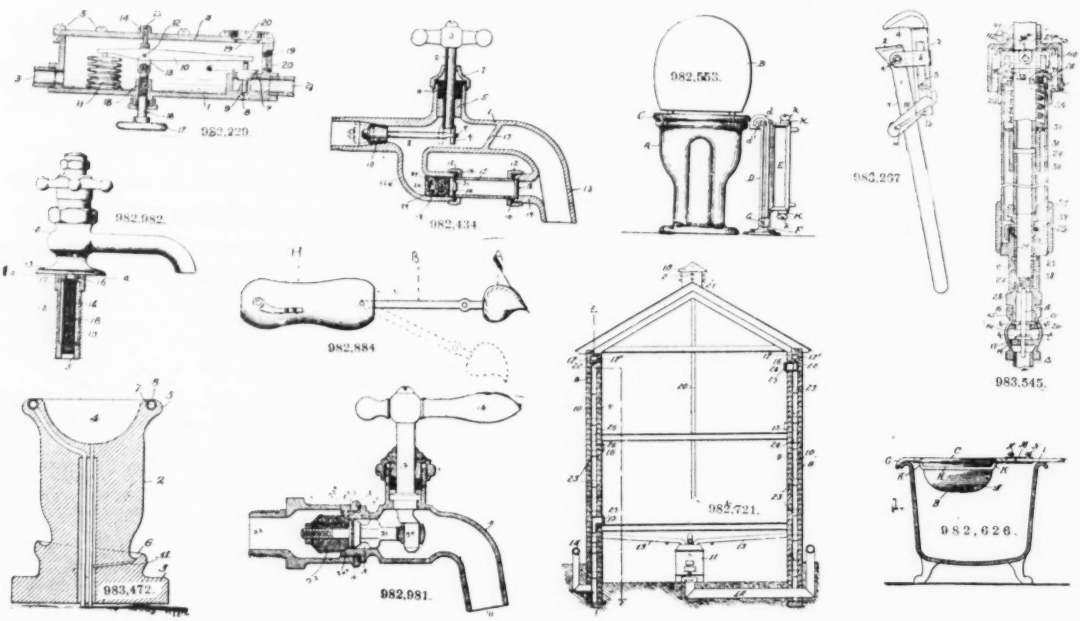
982,626. Sitz-Bath Attachment. Frank Netschert, New York, N. Y. In a sitz-bath attachment for bath-tubs, a basin and a frame adapted to removably support said basin immediately adjacent to the front edge of the bath-tub, said frame comprising hooked portions adapted to engage said front edge so as to prevent rearward movement of the frame and rearwardly extending straight portions adapted to rest upon the rear edge of the tub.

982,675. Faucet. John F. Hill, Griffin, Ga.

982,677. Pump-Valve. James E. Householder, Cleveland, O., assignor of one-half to Charles W. Carlson, Cleveland, O.

982,719. Valve for Controlling the Water-Inlet of Automatic Sprinkler Systems. Richard B. Hewitt, Chicago, Ill., assignor to General Fire Extinguisher Co., New York, N. Y., a corporation of New York.

982,721. Apparatus for Heating, Cooling, and Ventilating Buildings. Emery C. Hodges, Joliet, Ill. The combination with a double walled building having a continuous air-space between the walls, of a hollow top-wall plate having apertures through one wall thereof and communicating with the continuous air-space, a hollow gable-end wall plate the hollow space therein registering with the



space in the top-wall plate, a ventilating chimney having pivoted dampers, means to operate the dampers, and means outside of the building and near the bottom thereof to permit the passage of air into the continuous air-space, substantially as shown and described.

982,884. Soldering-Iron for Soft-Soldering. Heinrich Schweitzer, New York, N. Y. The combination in a soldering iron of a handle having a longitudinal groove along one side thereof, a rod hinged at one end to said handle adjacent to an end of said groove, a copper bulk on the other end of said rod, and means mounted in the handle for locking said rod in said groove when said rod is swung about its hinge into the groove.

982,981. Cock or Faucet. Henry Mueller, Decatur, Ill., assignor to The H. Mueller Manufacturing Co., Decatur, Ill., a corporation of Illinois. As a new article of manufacture, a valve element adapted to partially close a water passage, the perimeter of said valve element having an annular series of individual faces separated by ports or passages, and beveled surfaces on either side of said individual faces, as and for the purpose specified. In a valve structure, a main valve, a preliminary valve in advance thereof and adapted to slidably fit a water passage in the valve structure, said preliminary valve having its greatest diameter divided into a multiplicity of individual faces separated by ports, a beveled face extending from the perimeter of the preliminary valve on one side to a point coincident with the main valve, and a relatively long bevel on the opposite side of the premilinary valve.

982,982. Strainer for Faucets. Henry Mueller, Decatur, Ill.; Ora B. Mueller and Adolph Mueller, executors of said Henry Mueller, decreased, assignors to H. Mueller Manufacturing Co., Decatur, Ill., a corporation of Illinois. The combination with a faucet having a shank channel for water, of a compressible strainer positioned within said channel, said shank having an outlet and an inlet for the water, said shank being contracted at its inlet end, said strainer at one end adapted to fit snugly in the contracted end of said shank to be compressingly held in position, an imperforate closure upon said strainer at its end adjacent the outlet of said channel, and means carried by said shank, abutting upon said imperforate closure, within the plane of said channel, for preventing the displacement of said strainer in the direction of flow of the filtered water.

983,267. Pipe-Wrench. Frank F. Corbin, Easthampton, Mass. The combination, in a pipe wrench, with a main shank having a jaw at one end, and a movable shank having a jaw at one end, in operative relation to said first-mentioned jaw, and having its opposite end slidingly mounted on said main-shank, of a link pivotally connected with said movable shank and provided with a movable member to engage and release said main shank, a spring arranged to actuate said link into engagement with said main shank and to throw backward the jaw-provided terminal of said movable shank, and a clevis connecting said shanks to limit such backward movement of said movable shank.

983,472. Sanitary Drinking-Fountain. William T. Bancroft and Neilson W. Van Liew, Kansas City, Mo. A drinking fountain embodying a basin, a pipe having ports through which water is discharged on the rim of said basin, and an outlet pipe for the basin having a port of less area than the discharge ports of the first-mentioned pipe.

983,545. Hydrant. John Ewart, Arlington, Mass., assignor of one-half to M. P. McLaughlin, Wakefield, Mass. A hydrant comprising a tubular casing adapted for attachment to a water-main, and having an internal valve seat, a tubular conduit rotatable and movable endwise in said casing and provided with a valve adapted to close on said seat, a spring adapted to move the conduit in one direction to close the valve, cams supported by the casing and runners connected with the conduit and pressed by the spring against said cams, the cams and runners causing an endwise movement of the conduit to open the valve when the conduit is rotated in the casing.

983,279. Hydrant. George W. Hayden, Hartford, Conn., assignor to The Pratt & Cady Co., Hartford, Conn., a corporation of Connecticut.